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Electric Railway Journal

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear direct under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

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Accident claim department
Accidents (including wrecks)
Safety first

CARS AND OTHER VEHICLES
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Cars
Locomotives
Motor buses
Motor cars, Gasoline
Motor trucks
Service and tower wagons
Trackless trolley
Work and wrecking cars

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Brakes and compressors
Controllers and wiring
Couplers and bumpers
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Gears and pinions
Headlights
Motors
Seats and windows
Wheels

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Wage increases denied
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Financial
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Legal
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Lubrication
Maintenance practice
Metals
Repair shop practice
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

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Fuel
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Power distribution
Power generation
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Substations and equipment

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Power stations and equipment
Repair shops and equipment
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Terminals
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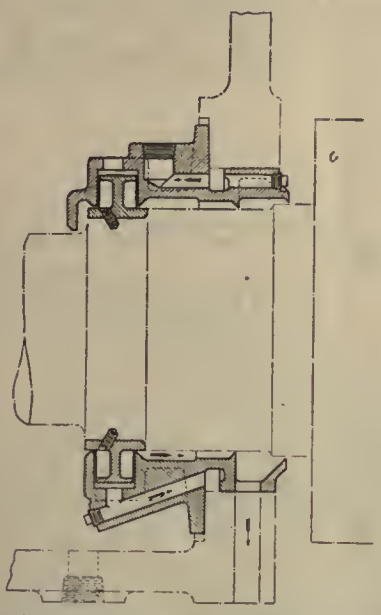
OFFICES:

Boston, Mass.	New York, N. Y.
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Los Angeles, Cal.	St. Paul, Minn.
Mexico City, Mex.	Washington, D. C.



Typical "Safety" Car

Reliable—and Why



No Rubbing Parts In the Westinghouse Water-Sealed Gland

(Advertisement No. 3—Feature No. 3)

THE packing of a steam turbine is a detail of great importance and deserving of the careful consideration of the turbine buyer.

The function of the turbine packing gland is to seal the turbine against the admission of air into the turbine cylinder when operating condensing, and to prevent the escape of steam to atmosphere during non-condensing operation.

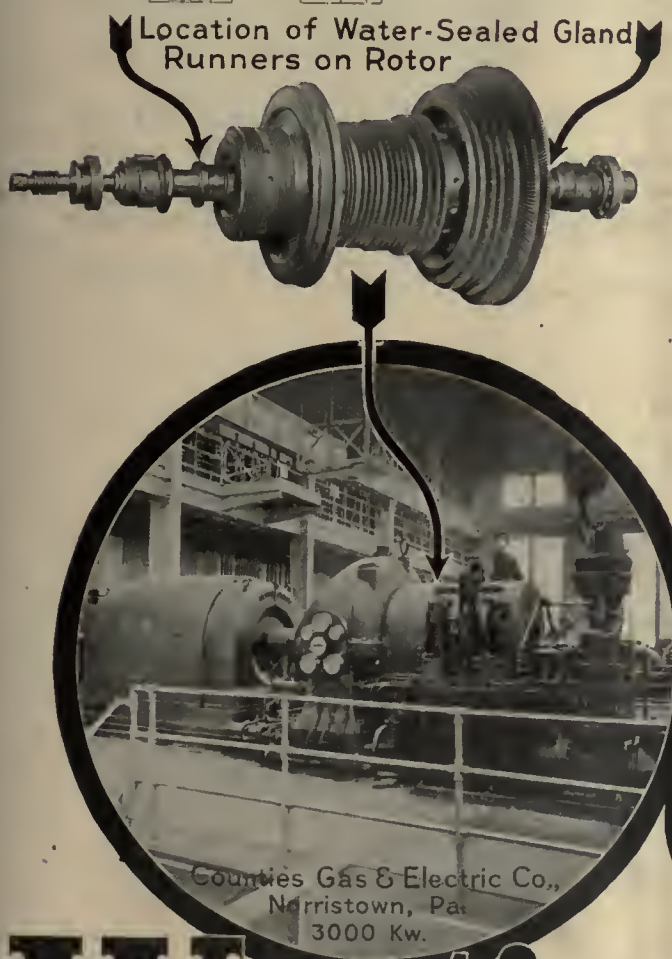
Turbine packing glands are of three general types:

First—Those depending upon the rubbing contact of carbon rings, which necessarily entails wear and sometimes local heating of the turbine shaft, as well as objectionable air leakage into the turbine and steam leakage into the engine room.

Second — Those employing labyrinth packing, which is steam-sealed. Objectionable steam leakage into the engine room, and impaired economy owing to lowered vacuum, are common to this type.

Third—The Westinghouse Water-Sealed Gland, in which there are no rubbing parts, and in which there can be no wear. The seal is perfect, with nothing to impair the turbine efficiency.

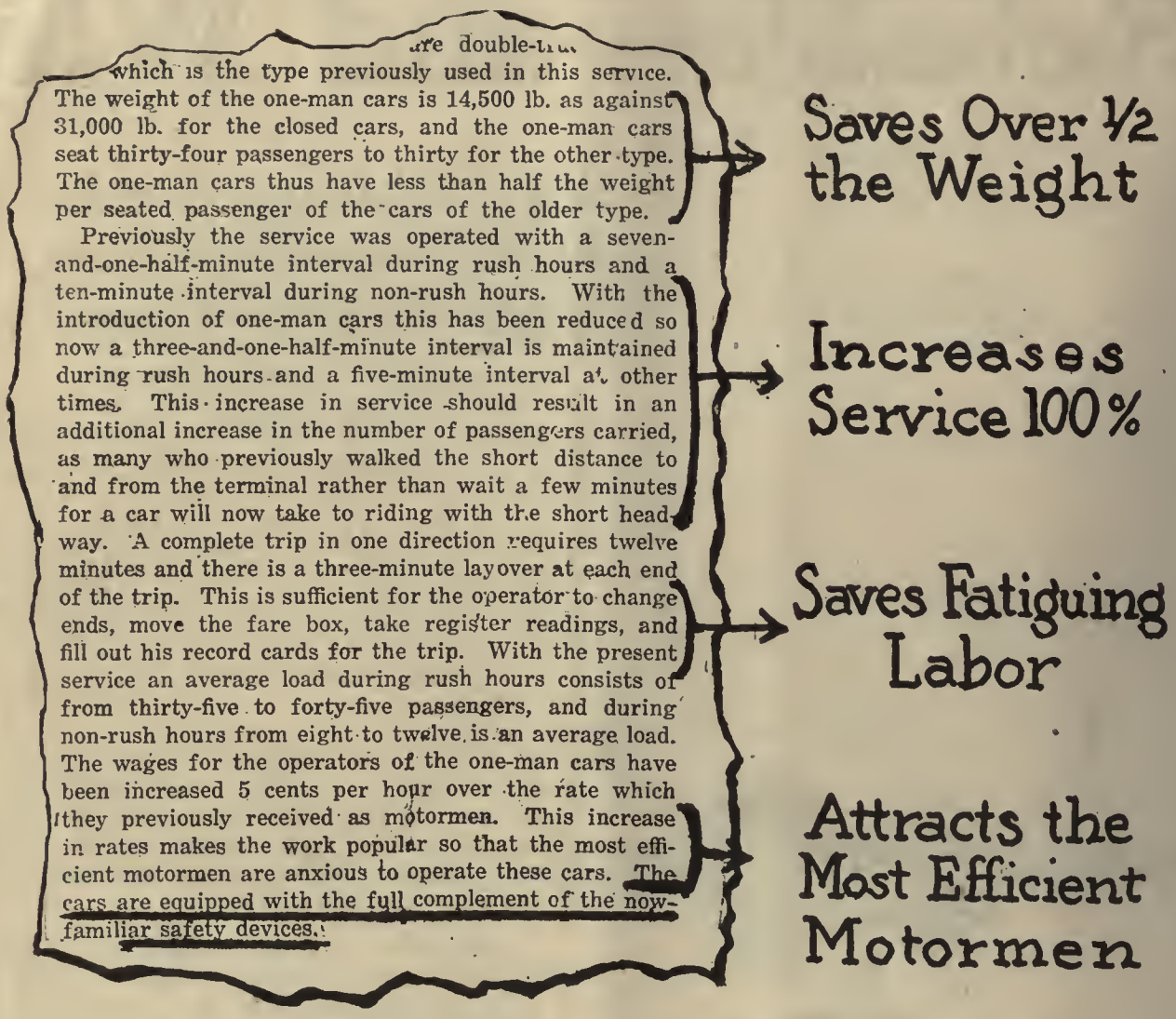
The Westinghouse Water-Sealed Gland contributes materially to the high operating efficiency and the reliability of the Westinghouse Steam Turbine.



W
WESTINGHOUSE ELECTRIC

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse



The Safety Car

It does all these things and many others, too. It reduces operating expenses and provides all-around safety to passengers.

Many roads, especially in the large cities, do not believe the safety car practical for their service. The majority of these roads are using safety cars today. They had to be convinced that these cars could make good under heavy as well as light traffic conditions.

That is why we want to make a study of your system. We want to convince you that YOU can benefit by the many advantages of the safety car.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO Railway Exchange Bldg. | WASHINGTON, D. C. Munsey Bldg. | NEW YORK City Investment Bldg. | PITTSBURGH Westinghouse Bldg.

SAN FRANCISCO Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

The Trainmen and the Shopmen Like Them

O-B Catchers and Retrievers are popular with the trainmen because they operate promptly and efficiently—without fuss.

And they are favorites in the shop because their rugged simplicity keeps them on the cars without repairs.



O-B Trolley Catcher (patented)
For city service



O-B Trolley Retriever (patented)
For high speed service

O-B Trolley Catcher Has Positive Action

When the pole flies the O-B Trolley Catcher stops it positively.

The rebound is never sufficient to release the catcher's hold and permit the pole to "step-up".

O-B Trolley Retriever Quick on the Trigger

The instant the wheel leaves the wire the O-B Retriever stops the pole and the powerful spring pulls it well below trolley height. Even at very high speed a flying pole does no damage.

The Ohio Brass Company, Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco

Manufacturers: Car Equipment Specialties, Line Material, Rail Bonds, High Tension Porcelain Insulators, Third Rail Insulators



Phono-Electric

For City or Interurban Car Requirements

Because this No. 00 round wire is Phono-Electric Trolley Wire, there is no question that it will continue to make good for years at this intersection, where trains of the big Seattle interurban cars pass over the city tracks.

Naturally, these big-car trains draw heavier amperage than ordinary cars, but the ability of Phono-Electric to withstand high "drafts"—which means high temperature, without losing its remarkable strength and toughness (and without permanent elongation) insure a far longer period of uninterrupted service than would be possible with any other practicable conductor.

Bridgeport Brass Company

Bridgeport Connecticut

2226



There are other features—but the main point is economy

More important just now than ever before, the overshadowing fact about Steel Twin Tie Track is its first cost economy.

Economy of materials because all the concrete in the track foundation takes its share of the load through the three foot by thirteen inch bearing plates.

Economy of labor because of the simple taper jaw rail clip and the elimination of gauging and excessive surfacing.

The eleven years of facts behind Steel Twin Tie Track make an imposing collection of data. But they may be boiled down to two words: Permanence and Economy, the two essentials of good engineering.

Steel Twin Tie Track

THE INTERNATIONAL STEEL TIE CO. Cleveland, Ohio

"COPPERWELD"

TRADE MARK REG. U. S. PAT. OFF.



"Copperweld" is a copper conductor with the strength of steel.

Its 60% greater tensile strength prevents the wire from sagging and causing excessive wear at ears and hangers.

A short circuit will not anneal "Copperweld," as it does hard drawn copper wire; in fact annealed "Copperweld" has a tensile strength equal to hard drawn copper wire.

"Copperweld" Wire weighs from 7% to 10% less than copper (size for size). This reduces the weight of the overhead construction, and results in a saving in orginial investment.

"Copperweld" also costs less per pound, which accomplishes a further saving.

"Copperweld" outwears solid copper wire four to one—due in part to less flexure or bending near the supports, and also to the wearing qualities of the steel and copper surface which is presented when the copper becomes worn through on the underside.

If *you* are interested in the manufacture, characteristics, and use of "Copperweld" Wire, write for a copy of Catalogue No. 22.

COPPER CLAD STEEL COMPANY

OFFICE AND WORKS: RANKIN, PA. BRADDOCK P.O.
NEW YORK CITY OFFICE: 30 CHURCH ST.

ARISTOS COPPERWELD

WESTERN SALES REPRESENTATIVES:
STEEL SALES CORPORATION, CHICAGO, ILL.



BUY SAFETY CARS

WITH THESE

KEYSTONE SPECIALTIES

ELECTRIC SERVICE SUPPLIES COMPANY TRADE MARK

WRITE FOR BULLETIN NO. 167



Keystone Rotary Gongs

THE Birney one-man Safety Car has been called the Ford of the electric railway industry.

At any rate it is certainly the first STANDARD car of the electric railway industry.

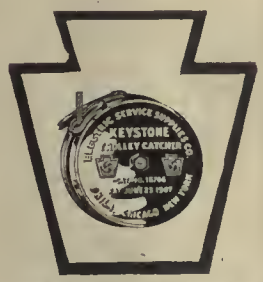
We are proud of the fact that these Keystone Car Specialties have already gone on or been specified for practically every Birney Safety Car.



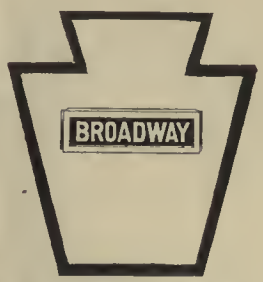
Faraday Car Signals



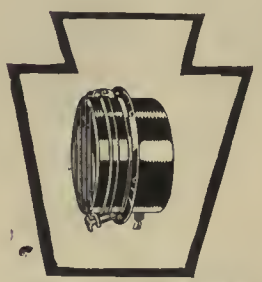
Keystone Air Sanders



Keystone Trolley Catchers



Illuminated Car Signs



"Golden Glow" Headlights

ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

CHICAGO
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

STYLE "N" COLOR LIGHT SIGNALS

UNION equipment will solve *your* interurban traffic problems. Let us study your operating conditions and co-operate with you in considering what *automatic block signaling* will do for *your* line.



Trade Mark

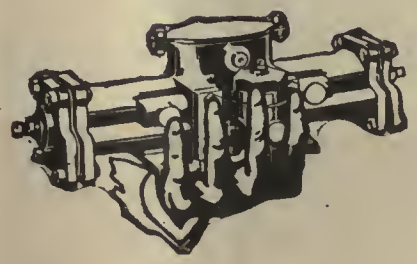
Union Switch & Signal Co.

SWISSVALE, PA.

Trade Mark

Pneumatized "Rushour" Cars Act Directly

Standardize! *Pneumatize!*



Tom Hood's classic pun: "The people told the sexton, and the sexton tolled the bell" is an instance of giving a signal *indirectly* or second-hand.

A common, down-to-dollars example of indirect action is to use conductors and motormen for go-betweens from door to controller when the message can be flashed from door to controller *direct.*

How is that costly interval of standing time being used in your big car or train operation now?

Do the conductors tell the bell, the bell tell the motorman and the motorman tell the controller that it's time to go?

Why not have the closing of the door tell the controller *directly* that it's time to move?

Thus, by saving time when time is most precious, you will

Make your peak periods produce maximum profit and efficiency!

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Needs No Day O' Rest



It is not the fact that it does the work in the shop—but that it does this work just as efficiently, as economically and as perfectly, as it builds up your track, or welds on your Apex Rail Joints. Your track may be in good condition and needs no welding just at present. But there is always some work in the shop to be done with a welder. The Indianapolis Welder is just the welder you need.

New Type Heavy Duty High Speed Indianapolis Portable Patented Electric Welder



is an "all around" welder. On the line or in the shop it welds its way into the hearts of railwaymen. Known all over the country for its perfect application of Apex Rail Joints. If you have not met it you should be introduced.

Allow us to send its details.

Some other "good things" we furnish:

Composite Welding Lenses—absolutely stop all ultra-violet rays.

Fluxated Welding Steel—insures perfect welds.

"Indianapal" Solid Manganese Crossings.

Indianapolis Switch & Frog Co.

Springfield, Ohio

Where Selection is Decided by Performance

"NATIONAL" TUBULAR STEEL POLES *Predominate*

EXPERIENCE has taught many valuable lessons in the selection of poles for trolley lines, electric lighting, telephone, telegraph, and signal systems. Perhaps the lessons of greatest value are those which resulted in the policy of choosing poles for long life, reliability, and, especially, for safety. The recognized safety (dependability) of "NATIONAL" TUBULAR STEEL POLES is a consideration of first and ultimate importance as evidenced by the extensive use of "NATIONAL" POLES throughout America.

Ask for a copy of "NATIONAL" Bulletin No. 14 — "NATIONAL" Tubular Steel Poles



NATIONAL TUBE COMPANY, PITTSBURGH, PA.

General Sales Offices: Frick Building

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul

PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle

EXPORT REPRESENTATIVES: U. S. Steel Products Co. New York City

TRAVELS TO TOWNS WHERE THERMIT INSERT RAIL WELDING TERMINATED TRACK TROUBLES





Thermit Insert Rail Welding in Oklahoma City, Okla.



OKLAHOMA CITY



Oklahoma City, the metropolis of the "Boomers' Paradise," lit on a rail maintenance paradise when it installed in city track about 900 THERMIT INSERT RAIL WELDS during 1916 and 1917.

These Thermit joints were welded in old rail at a very small cost. Only 3 breaks have been reported since their installation three or four years ago.

Send for Rail Welding Pamphlet 1232

METAL & THERMIT CORPORATION
120 Broadway
Chicago Pittsburgh San Francisco Toronto



"Next Stop, Dallas"



Dependable Service

The firm which specifies Anaconda Copper Wire deals directly with the producer of the raw material, and the maker and shipper of the finished product. The order once placed becomes the concern of an organization governed by undivided authority, an assurance of service that cannot be given where every step in the process is under separate management.

"From ore to finished Product" pledges dependable service to Anaconda patrons —a service that includes the delivery of an article unsurpassed in quality.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department
Mills—Great Falls, Montana
General Office—111 W. Washington St., Chicago

Anaconda Mills at Great Falls, Montana



ANACONDA Copper Wire
"From Ore to Finished Product"



H. C. B. Switch

WHARTON SPE

SWITCHES
MATES
FROGS
CROSSINGS

Solid Manganese Steel and Manganese Steel Insert

Converter and Electric Steel Castings
Hammer and Press Forgings Seamless Steel Gas Cylinders

WM. WHARTON, JR. & CO., INC.

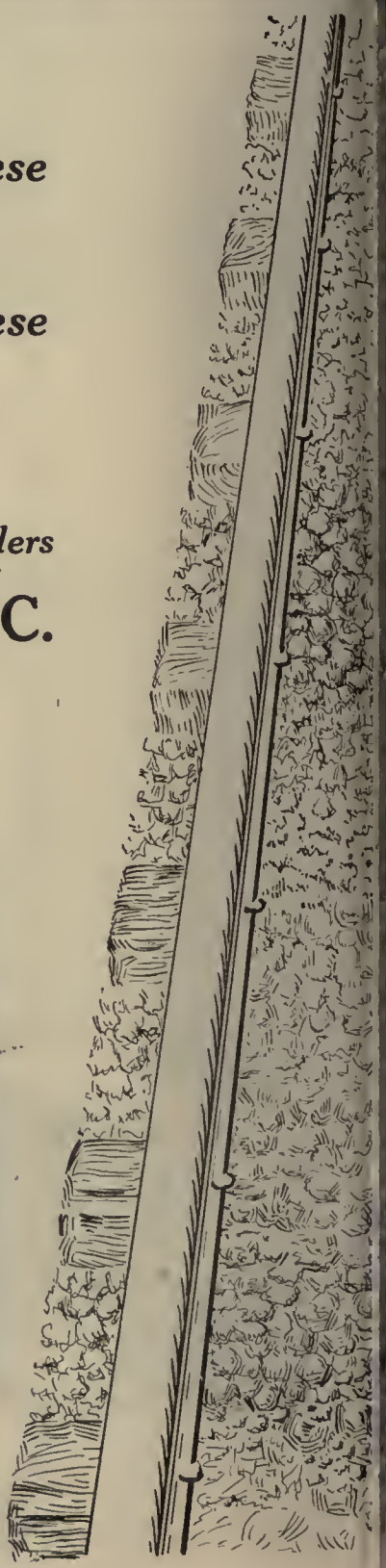
EASTON, PENNA.

"Originators of Manganese Steel Track Work"

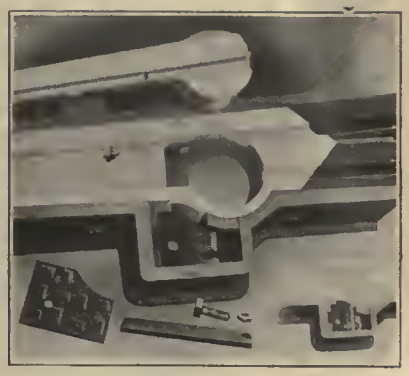
SALES OFFICES:

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Scranton, Pa.





AL TRACK WORK



"GIANT HEEL" Switch

The illustration below gives a comprehensive view of our large Layout Yard, where Special Track Work is assembled and carefully fitted together, to avoid any possibility of trouble during installation. No piece of work leaves our plant without such careful fitting.

Our extensive, modern plant, illustrated on the preceding page, is equipped to fabricate track work of all constructions, Solid Manganese Steel, Manganese Steel Insert, Plain Bolted and Manganese Steel "T" Rail, etc., which, coupled with our long experience, places us in a position to supply your needs efficiently.

Subsidiary of Taylor-Wharton Iron & Steel Co.

High Bridge, N. J.

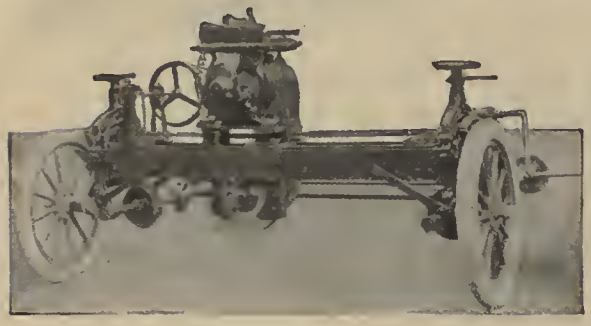
Other Plants:

TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.
PHILADELPHIA ROLL & MACHINE CO., Philadelphia
TIOGA STEEL & IRON CO., Philadelphia



ALL FOR YOUR SERVICE OUR SERVICE FOR ALL

The Universal Rotary Track Grinder



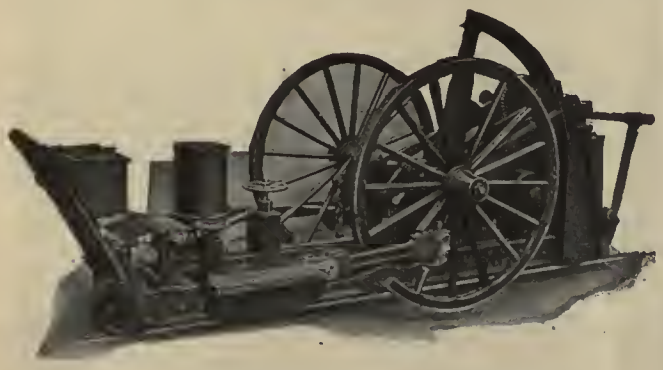
That surplus metal, that is left on the track after a low or cupped joint is built up, is easily, quickly and economically removed with this grinder. It has a grinding wheel that may be tilted to meet any angle of the rail head—Outboard Bearings, Grinding Wheel Guides and many other important features.

The Atlas Rail Grinder

Especially adapted to getting into the grooves of girder rails, frogs, switches, etc., and for removing surplus metal used to fill up low joints. The Grinding Wheel travels over track in guides.



The Reciprocating Track Grinder



With this grinder it is impossible for the grinding element to fall into a low spot. Especially adapted to grinding out corrugations, slightly cupped and new joints where a planetary grinding surface facilitates the work. Produces best results in grinding with removal of minimum of metal from rail head.

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

EXCLUSIVE AGENTS:

ATLAS RAILWAY SUPPLY CO. Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO. Pittsburgh, Pa.

CHAS. N. WOOD CO. Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc. 77A Queen Victoria St., E. C. London, England



Is the performance of your drills "remarkable" in the hands of unskilled labor?

THE South Covington and Cincinnati Street Ry. Co., Covington, Ky., has this to say of its Little Giant Portable Electric Track Drill:

"We consider its performance remarkable, as it is used entirely by unskilled labor under the most severe conditions of exposure and abuse. It seldom needs repairs and runs as well today as when we bought it."

Are your track drills meeting present-day labor conditions with service *plus?* "Little Giants" handle track drilling operations at speeds *ten to twelve times faster* than old-time hand methods, and at a saving of 85 to 90% in cost.

May our Service Engineers work with you to this end? Bulletins upon request.

Illustration shows Little Giant Track Drill on the South Covington and Cincinnati Street Railway Company property, Covington, Ky.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building . 6 East 44th Street . New York

*Sales and *Service Branches all over the World*

*Birmingham *Boston *Buffalo *Chicago *Cincinnati *Cleveland *Detroit Eldorado El Paso Erie Franklin Houston Joplin *Los Angeles Milwaukee *Minneapolis *New Orleans *New York *Philadelphia *Pittsburgh *Portland Richmond Salt Lake City *San Francisco *Seattle *St. Louis Tucson Barcelona *Berlin Bombay Brussels Buenos Aires Cadiz Christiania *Fraserburgh Havana Honolulu Johannesburg Lisbon *London Madrid Milan *Montreal Osaka -Paris Seoul Tokyo Toronto Vancouver Winnipeg

EL-33

BOYER PNEUMATIC HAMMERS · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · · VACUUM PUMPS · · PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES ROCK DRILLS · · COAL DRILLS

LITTLE *Electric* **GIANT** *Tools*

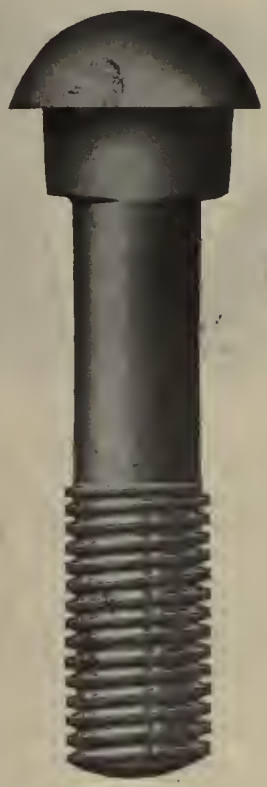
Lackawanna

Track Bolts and Spikes

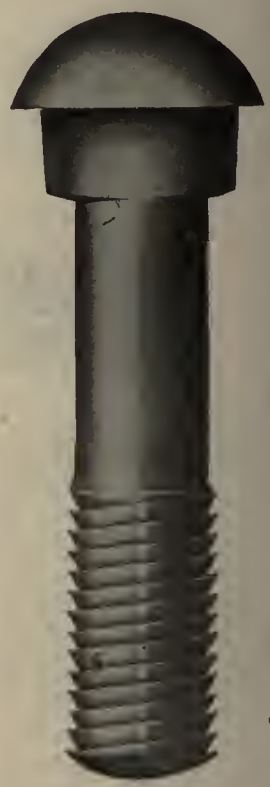




U. S. Standard
Cut Thread



U. S. Standard
Rolled Thread



Buttress (Harvey
Grip)
Rolled Thread



Ideal Recessed Nut

Lackawanna Track Bolts and Spikes

Our production of track accessories has been marked by critical attention to detail and constant endeavor to give the track man the best possible service and efficiency. This policy has distinguished our manufacture of Railroad Track Bolts and Spikes and has resulted in giving Lackawanna an enviable reputation for accomplishments in this field.

Our facilities for the manufacture of Track Bolts and Spikes are thoroughly modern, ample for prompt deliveries on quantity orders, and, as the metal is worked up from the ore complete in our own plant, we can offer every assurance of high quality, coupled with manufacturing skill and effort.

LACKAWANNA TRACK BOLTS are furnished with either cut or rolled threads, the latter of either the standard or buttress (Harvey Grip) type.

The rolled threads are added to the bolt blank by rolling between two parallel flat dies after heading. As the process removes no metal, the strength of the threaded portion is equal to that of the rest of the shank. A rolled-thread bolt of given size is of smaller shank diameter and consequently lighter in weight than a bolt of the corresponding cut-thread size.

We make both cut and rolled-thread bolts in all desirable sizes from ½ to 1¼-inch diameter.

Unless otherwise specified, standard button-head oval-neck bolts with U. S. Standard rolled threads and plain square nuts are furnished. The various types of nuts that may be obtained are as follows:

SQUARE OR HEXAGON NUTS, the latter at slight extra charge to cover the greater manufacturing cost. Square nuts have in their favor the additional strength of extra metal in the corners, giving better wrench hold and protection against wear. Hexagon nuts, however, have the advantage of lighter weight, require less clearance space at angle of splice bar, and permit more applications of the wrench and shorter turns in tightening.

LACKAWANNA RECESSED NUTS are ⅛ to $\frac{3}{16}$-inch thicker than the ordinary type and have a depression in the bearing face of the nut. The recess surrounds the bolt immediately outside of the angle bar, thus leaving one or two unused threads upon which to tighten the nut when the joint becomes loose from wear or stretch of the bolt.

LACKAWANNA IDEAL NUTS are square nuts with the corners tapered off on the bearing side as a substitute for hexagon nuts in the matter of clearance, while otherwise having all the advantages of the square nut.

The slight extra cost of Recessed and Ideal Nuts is more than repaid in added usefulness, convenience, and reduced expense for removals.

LACKAWANNA TRACK SPIKES are made in all desirable sizes from $\frac{7}{16}$ by 2-inch to ⅝ by 6½-inch and by either hand-feed or automatic-feed machines, as determined by size, quantity, and contour desired. The Goldie-Point feature of sharpening the point on all four sides after the spike is finished can be added at slight additional charge.

In addition to the standard types shown we are prepared to quote on any others to meet railroad requirements. If you want specials, send blueprint or sample with your inquiry.

Other Lackawanna Aids to Better Track

The Lackawanna Safety-Head Angle Bar



overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle bar for a short space at the center where the rail ends meet.

The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

The Abbott Rail-Joint Plate



strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars, and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets, and for welding to the rail base, and may be held with either screw or ordinary spikes.

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

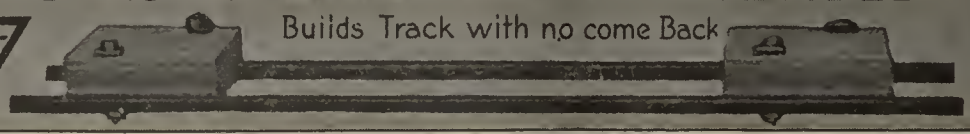
Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

496

The RESILIENT RAILWAY TIE

Builds Track with no come Back



Why does pavement last longer when the principle of

Resiliency

is applied to the car tracks?

The Asphalt cushion of the Resilient Railway Tie gives an unvarying deflection to the rail under the weight of the cars. Not too much as in the case of wood ties working in ballast nor too little as in monolithic construction. The joint ties prevent all working at the joints.

These things accomplished by Resilient Ties make toward pavement permanence.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BLDG., DAYTON, OHIO



TONCAN METAL CORRUGATED CULVERTS

This 60 inch Toncan Metal Corrugated Culvert is under the Lake Erie & Northern Ry. The fill is twenty feet.

Its length of service has been long enough to prove to the L. E. & N. Officials that corrugated culverts made of Toncan Metal are strong enough for the most exacting use,—and that they are rust resisting.

The condition of this culvert today is their proof. The depth of the fill and the unusually heavy loads have not affected the culvert—nor have the earth elements. This is true because Toncan Metal has wonderful rust-resisting qualities. Toncan Metal Culverts installed years ago are still in good condition.

Write for the name of your nearest manufacturer making corrugated culverts of Toncan Metal.

SPC TONCAN METAL

All Toncan Metal Culverts bear this trademark. It is your proof that you are getting the genuine Toncan Metal.

THE STARK ROLLING MILL COMPANY, Canton, Ohio

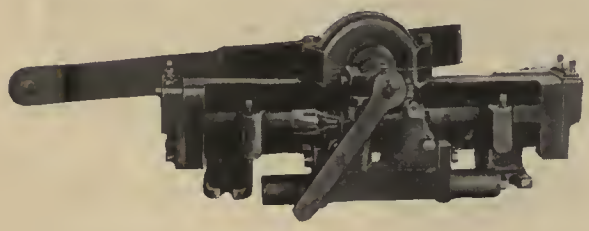
Sole Manufacturers of TONCAN METAL



Special Rush Hour Problems

on any railway can be solved as they have been solved on the

Boston Elevated Railway



Standard Geared Type Door Engine

by changes which include the use of the Consolidated Car-Heating Company's

Geared Type Door Engine

because this door engine is applicable to every class of service where either manual or push button door control is an absolute necessity.

Railways in many cities with conditions entirely different than those previously existing in Boston are now specifying Consolidated Car-Heating Company's geared type door engine because of its adaptability to give good service on any existing equipment.

Railways which are utilizing heavier loading for rush-hour service by use of additional cars or cars in trains and speeding up of schedules by skip stops agree that in general the increased revenue from increased car miles can in part be traced directly as the result of installing geared type door engines.

CONSOLIDATED CAR-HEATING COMPANY

Albany, New York

New York City **Chicago** **Coaticook, Quebec**





CHAPTER TEN

THE ALL-*BUT* PERFECT STATE

Neutralizing the Sins of Commissions

In the All-But Perfect State, contrary to general belief, there will be commissions—but the standard dictionary of that state will give a different definition of the word than the general conception.

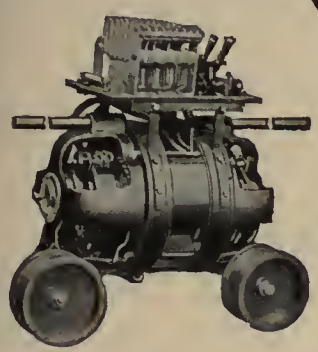
A commission there will be known as dispensers of the O.K.

Their chief work will be to curb the railways from continually reducing fares, shortening headways and doing other acts of charity toward the public—for they will argue that this state of mind called the public is the same mind that prays for cold weather in summer and warm weather in winter—wears furs in July and necklaces in December—it must be arbitrary—it must criticize everything it sees, therefore:

Satisfy your ideals of improvement by improving those things that the public does not see—and consequently cannot gossip about.

For instance, bond your rails with the Dynamotor—weld your rails with the Dynamotor.

The public cannot see permanent conductivity of the return circuit but you can feel it financially.



READING NUMBER 10.

Q. What does it cost to operate a Dynamotor?

A. It does not cost anything. *It pays.*

If you have an appropriation for gear cases and the Dynamotor rejuvenates your scrapped cases—that's paying.

When you have a bonding or rail-welding job to do and the Dynamotor does it for a fraction of any other cost—that's paying.

The Dynamotor *pays.*

Rail Welding and Bonding Company

formerly The Lincoln Bonding Co.



Cleveland, Ohio.



TEXACO LUBRICANTS

for railway shop, power plant and rolling stock

Texaco Lubrication Engineers will gladly assist you in selecting the right Texaco Lubricants for your shop—power-plant, rolling stock, or any other equipment.

You may call upon them to make a survey of the equipment if necessary. This is Texaco Service—there is no charge.

THE TEXAS COMPANY

Dept. RJ, 17 Battery Place, New York City

New York Chicago Houston

Offices in Principal Cities

Measure Power Save Power

To save power—measure the unit you wish to save—not an indirect unit.

The ECONOMY Meter measures in "power units," not in indirect units as do other devices.

The ECONOMY Meter stimulates correct feeding and braking. Other devices put a high premium on excessively fast feeding, which does not correspondingly reduce energy consumption.

Every operating official, every motorman, every mechanic, knows that the ECONOMY Meter measures the power consumed by the car.

When using ECONOMY Meters motormen appreciate and know absolutely, trip by trip, whether or not their efforts result in actual reductions of power. With other power-saving devices motormen do not directly know whether they have actually saved power.



Economy Meter on Birney Safety Car

There is no mystery about power saving with ECONOMY Meters

The ECONOMY Meter requires *minimum* attention in its upkeep and maintenance. It does not need to be rewound at frequent intervals as do other devices.

The ECONOMY Meter is a rugged device. Over 300,000 Sangamo meters with the same type elements are in daily use where meters are needed that will withstand rough usage.

ECONOMY Meters installed on your cars will save from 10 to 20% of your total traction power. More than 50 installations and tests have demonstrated this.

ECONOMY Meters afford a correct and dependable basis on which car equipment can be inspected and maintained.

Ask for Deferred Payment Plan and estimate of operating costs

ECONOMY ELECTRIC DEVICES COMPANY

Old Colony Bldg., Chicago

National Railway Appliance Co., New York — Burton R. Stare Co., Seattle — Ludwig Hommel & Co., Pittsburgh
L. A. Nott, San Francisco — J. G. Monahan, Los Angeles

Give them a square deal

To managers of electric Railway Properties: if you are to hold your Superintendent of Transportation and your Conductors accountable for fare collection, you must give them some means of making a positive and accurate check on all receipts.

Without this check on fares it is difficult to place responsibility for loss of revenue; it's hard to keep the honest conductor and it's almost impossible to get rid of the dishonest one.

With Johnson Registering Fare Boxes every fare collected is instantly and accurately recorded. It receives and registers nickels, dimes and pennies, and two sizes of metal tickets. It offers the safeguard of immediate, accurate, visible registration of each fare as paid.

Any of the more than 200 electric railways using Johnson Fare Boxes will tell you how they save time, speed up schedules, improve service and increase revenue by means of this efficient system of fare collection.

Johnson Fare Box Company

Chicago
4619-4625 E. Ravenswood Ave.

50 East 42nd Street
New York

Open-hearth Steel Sockets

Steel Lever Sockets for Jacks

have proved to be the most dependable and economical.

We furnish all of the steel

sockets for Simplex jacks, including their square socket design.

For over 15 years the manu-

facturers of Simplex jacks have found that our open-hearth steel lever sockets meet their most rigid demands.

American Steel Foundries

New York Chicago St. Louis

CONDULETS.

Condulet the Job

Make Snap Switches Weather Proof

CONDULETS of the GS series provide water, gas, steam and dust-tight enclosures for rotary snap switches. The operating handle can be adjusted to stand in correct relation to switch blades, thus indicating "off" or "on" position.

The Condulet hubs have an integral bushing and a tapered thread for conduit and therefore, can be made water-tight. These Condulets are made in different hub sizes and arrangements to facilitate installation.

Complete and detailed information on these and many other Condulets can be found in the Condulet catalog. Send for one.

CROUSE-HINDS COMPANY

SYRACUSE, N. Y.

BOSTON NEW YORK CHICAGO

Condulets Panelboards
Knife Switches Floodlights
Guy Anchors

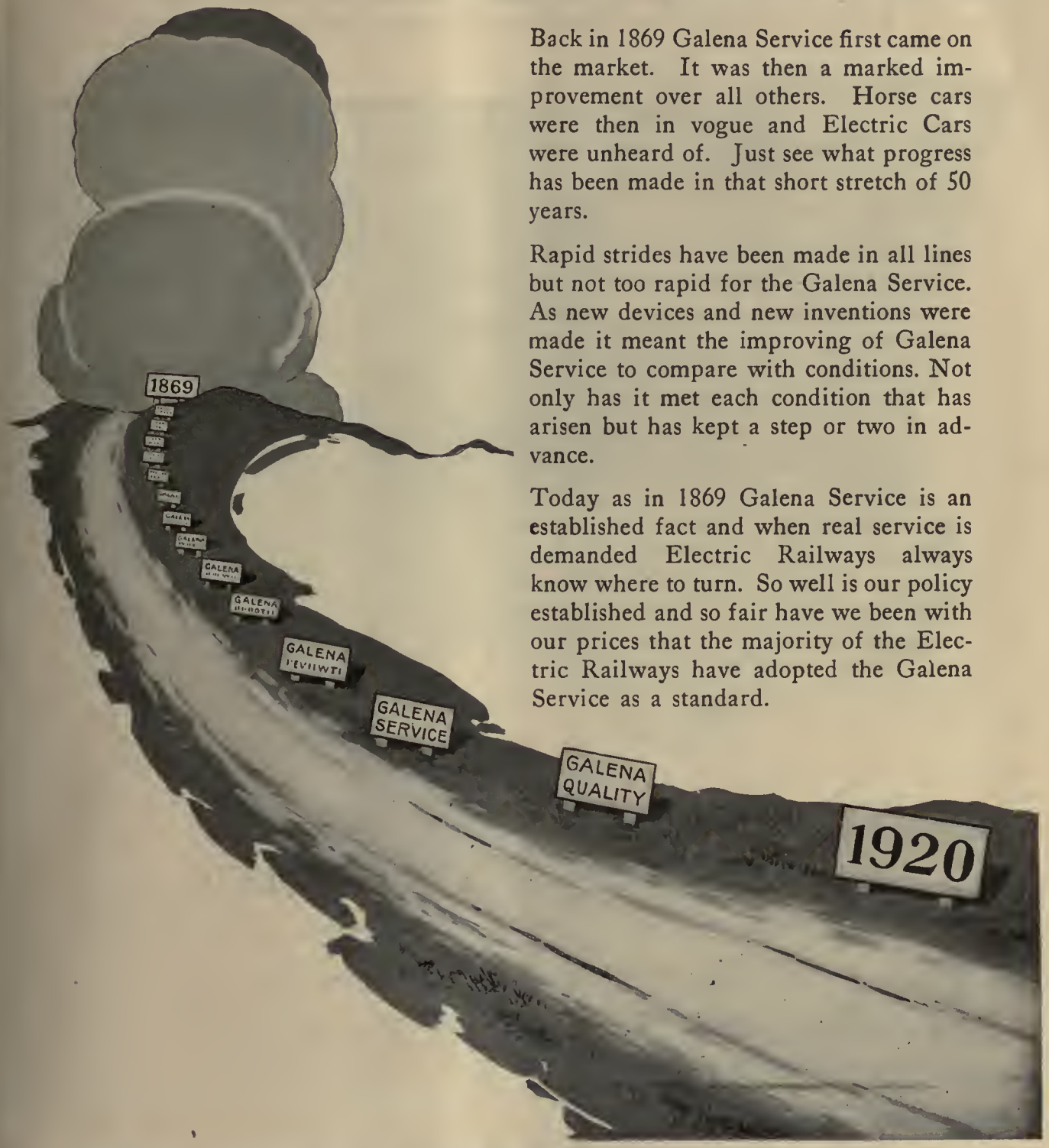
1570



GS CONDULETS
are regularly made of cast iron but brass can be furnished if desired.

CROUSE-HINDS

Along the Road of Progress
50 Years of Galena Service



Back in 1869 Galena Service first came on the market. It was then a marked improvement over all others. Horse cars were then in vogue and Electric Cars were unheard of. Just see what progress has been made in that short stretch of 50 years.

Rapid strides have been made in all lines but not too rapid for the Galena Service. As new devices and new inventions were made it meant the improving of Galena Service to compare with conditions. Not only has it met each condition that has arisen but has kept a step or two in advance.

Today as in 1869 Galena Service is an established fact and when real service is demanded Electric Railways always know where to turn. So well is our policy established and so fair have we been with our prices that the majority of the Electric Railways have adopted the Galena Service as a standard.

Galena-Signal Oil Company

New York *Franklin, Pa.* *Chicago*

and all principal American cities

LONDON TORONTO BUENOS AIRES MONTREAL PARIS

Economy is not based on price alone—the ratio of service received to money spent is the true index to value



A Cast Steel Gear
with the reliability of a forging

Constant betterment in the casting of blanks has given

Grade B Cast Steel Gearing

practically the reliability of a forged gear. Besides being the only cast gears that will operate with Grade M pinions, Grade B gearing nearly equals the wearing qualities of the best heat-treated forged gear at a lower first cost.

Ask our district gear specialists for further information.

40-134

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
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GEORGE BUSHFIELD, Editorial Representative G. J. MACMURRAY, News Editor W. R. ANDERSON, Asst. News Editor

Volume 56 New York, Saturday, July 3, 1920 *Number* 1

Attend the Ottawa Beach Meeting of the C. E. R. A.

IF ANY ONE is hesitating about whether he will attend the C. E. R. A. meeting at Ottawa Beach, Mich., July 8 and 9, we should like to assure him that he will find his time spent not only profitably but most pleasantly, for Ottawa Beach is a delightful summer convention spot. It has some of the attributes of Atlantic City as a convention place. The Hotel Ottawa and environs are isolated in a measure from outside attractions so that delegates will find a greater fraternizing than prevails where the convention is less unto itself. We feel confident, also, that the time spent traveling to the convention will be amply rewarded, though it may be a rather complicated journey in a few cases. In this connection, we might suggest that the easiest ways to go are either via Grand Rapids or Chicago—interurban from the former and boat from the latter direct to Ottawa Beach. Also, special interurban through cars are arranged from some points.

The Hotel Ottawa is situated on the beautiful Black Lake, but only a five-minute walk (in a bathing suit) to Lake Michigan's beautiful shore—sandy and clean. Just across the channel from Ottawa Beach is Macatawa Park, famous as a summer resort for cottagers. There are good boat trips to be had up Black Lake to Holland or down the shore of Lake Michigan to Saugatuck, and much scenery en route. All these places have proved so popular to resorters that we feel confident the convention at Ottawa Beach will be a close second if not superior to the customary boat trip, which had to be abandoned this year. And with John Collins as the big boss of the hotel, we feel sure things will be right and enjoyable there. Let's all go to Ottawa Beach for a good outing and a characteristically worth-while meeting.

A Friendly Bit of Advice Overheard from Part of the Public

ADVICE, impartial, absolutely unbiased and from a trustworthy source, is priceless. We have found a sample and are quoting it herewith. It is an editorial from *Printers Ink* (June 17), a paper for publishers and advertisers, expert critic of advertising. The editorial is not written to be directed toward the electric railway, but merely takes as an example the publicity which the Interborough Rapid Transit Company has been putting out through its *Subway Sun*, using this example in the discussion of negative and positive advertising.

The "Negative" Argument Again

Only in rare instances have negative arguments in advertising campaigns proved successful. As a general rule, it is the positive or affirmative presentation of a story that brings the response. Negative arguments too often work away from the advertiser's interest and fortify his legitimate prospects against him.

As an illustration of this, the advertising campaign now being conducted by the Interborough Rapid Transit Company of New York to secure an increased fare may be examined with interest. The company has so far been unsuccessful in convincing the public that it should pay more than 5 cents for a ride on its cars. A bulletin called the *Subway Sun*, placed in the windows of its cars, is the advertising medium used. For successive weeks these bulletins have been telling the company's troubles to its patrons—how it will have to sell its real estate, that municipal ownership will not give the public any better service than the Interborough is giving now, how it will be unable to construct new lines for the growing city—and always adding to each appeal that the present 5-cent fare is inadequate.

All these arguments are negative. The individual user of the company's cars is not interested in the company's troubles. He is interested in his own comfort and convenience before anything else.

Here is where the use of affirmative or positive arguments would be more apt to enlist the interest of the public in helping to change the conditions. One such argument would be the improved service that an increased fare would make possible—less time to get from home to office—and less crowded cars. Another argument would be to tell the public how many cars are being run now for a 5-cent fare and how many more could be run for a higher fare. Also some of the improvements which could be put into effect just as soon as the increased fare takes effect—safety devices, new cars, lighting, ventilation, new lines.

Then there is the story that could be told about the wonderful devices the company now has in use for the public's protection—the motorman's "dead man's handle," automatic signaling, block divisions, how the cars are cleaned, heated and the public's health and safety looked after all the while.

Thousands of people pay 10 cents for a short trip on a Fifth Avenue bus and think nothing of it, because the bus company assures every passenger a seat and it has enough buses to do it. You can ride 20 miles on the subway for a nickel and nobody cares a whoop, because the subway does it grudgingly, complaining all the way about its own troubles.

Many street railway companies in other cities have succeeded in securing increased fares by affirmative advertising of the kind referred to. Negative arguments often "sell" the negative condition. Positive, constructive, upbuilding arguments inspire a desire for the things they tell about.

We quote this not for the benefit of the Interborough Rapid Transit Company management, which has probably already seen it, but because many railway companies use similar methods of publicity and more and more is publicity of the right sort urged. Here we have caught, unawares, as it were, an intimate discussion of our methods from an observant and discriminating part of the public, doubly able to judge of the effects of our work, for they who discuss it are careful students of advertising methods.

We believe these suggestions and criticisms should be heeded. There is at least food for thought in them. They are certainly impartially made and they must be well taken, for they come from some of the very public we are trying to reach and are a part of their own family discussions, in which a piece of our work is used as an example from which to profit by avoiding. Here is a statement too not only *how not to do* a certain thing but also *how to do it*. We need more of that—not preaching, but real honest-to-goodness, heart-to-heart talk from the inside out by those who know.

Co-operation Between City and Company Urged in Philadelphia

AN OUTSTANDING feature of Director Twining's report, made public last week, is that, while he does not hesitate to criticise the local company for faults which he says he sees, he urges as the one solution to Philadelphia's problem whole-hearted and unselfish co-operation between city and company. Certain it is that a continued quarrel between a city and its transportation corporation merely makes more difficult the rendering of good transit facilities on a sound financial basis. It is not surprising that Mr. Twining favors this policy, and we believe the industry as a whole should feel encouraged that municipal officials are more and more supporting such programs of co-operation.

Costly Non-Revenue Car-Hours Have Effect on Labor Contracts

WORK being done by the new committee on economics of schedules of the American Electric Railway Transportation and Traffic Association in the way of standardizing time-table statistics of the various railway companies should be of considerable value to the industry and warrants serious discussion at the coming convention. At no time is the question of revenue and non-revenue car-hours of more importance than in the drafting of new labor contracts. Study and action on this subject should be of particular interest at a time when so many companies are engaged in negotiations with their platform employees.

Just what non-revenue hours mean to a railway company may be judged from the statement of one operator that his week-day schedules contain practically one-fifth of "dead" time, or time when cars are earning nothing for the management. With the growing demand on the part of labor organizations for an eight-hour day this burden is bound to become more serious. Similar hazards are contained in agreements providing for an eight or a nine hour minimum workday, because where it is not economical to keep cars in service that long a certain amount of "bonus" time must be added to the cost of operation.

The largest item contained in non-revenue hours in a railway schedule undoubtedly is that made up by terminal or layover time. The association committee can serve a useful purpose in educating the companies toward economy in this regard. A schedule maker, of course, must have in mind some standard for layover allowance when framing his time tables. This should depend largely on conditions existing on the individual routes, because car lines with steam railroad crossings at grade or with heavy vehicle traffic cannot be operated with such regularity as those where no such delays are to be encountered. However, even where due allowance is made for blockades it is a regrettable fact that many schedule makers allow too much "slack" in running time between terminals, and the result is a line of cars waiting at ends of a line. This not only is waste of good money but it has an unfortunate effect on the public mind, where the impression is given that the company has cars for storage purposes and not for service.

Contracts made with labor unions in recent years are being stretched to the point of unwarranted liberality in allowances for reporting time, turning-in time and meal reliefs. Combination of these items runs as high as sixty minutes per run with some companies, and where thousands of runs are to be paid for at $1.50 per crew-hour the cost in a year on a large property is a staggering factor. The result is even more burdensome on a system where overtime bears a penalty rate and where non-revenue hours are included in the items going to make up overtime.

While negotiating with the trainmen's union recently, a railway manager called attention to these heavy burdens borne by the company and said the men were receiving approximately 5 cents an hour as "bonus." The answer of the union officials was that this was not apparent to the men and they could not appreciate it. They were unwilling, however, to have any of these working conditions changed. Apropos of this point, we recall the recent ruling of an arbitrator that "bonus" time is never appreciated by the employee and should be added to the regular rate of pay.

Boards of arbitration have been slow to concede the eight-hour day to electric railway employees. They have been impressed with the fact that the traveling public demands maximum service at periods of the day separated by more than eight hours and that in this particular the transportation business differs from other industries. There are few railway companies in the United States where the eight-hour day prevails for platform employees, and even on these properties it has been found necessary to allow a certain percentage of the runs to cover a "spread" as high as fourteen hours.

Men who accept work as conductors or motormen must learn to appreciate wherein their industry differs from others and to value more highly the factor of continuous employment as against the limited number of working days in seasonal occupations. They will find, for instance, that hourly rates as high as $1.25 in the building trades do not mean as high an annual income as this figure would indicate. Also, while there has been considerable agitation for an eight-hour day, experience shows that many employees will pick runs allowing the greatest number of pay hours, and others who have a short workday will seek additional employment in their spare time so as to add to their daily earnings. Labor union officials would do well to consider these facts while negotiating for new agreements with employers.

How Much Freight Haulage Is Done at a Profit?

THE paper by W. K. Zinsmeister read at the convention of the New York Electric Railway Association last Saturday and published in abstract in this issue is the first attempt, so far as we can recall, to present a definite classification of accounts for electric railway freight operation. One of the aphorisms of the late Mr. Whitridge was that there was no profit in doing business at less than cost. This applies to the electric freight business as well as to the electric passenger business. Hence, it is most important for every electric railway which hauls freight to know how much this service is costing, and for this knowledge an accurate plan for determining the cost is essential.

There is great difference of opinion among electric railway managers as to the desirability of engaging in freight or express haulage. Some claim that if all the expenses properly chargeable to freight operation are included very few electric freight services in this country would be found profitable. Others believe that for most interurban roads and for many suburban roads which have not undertaken this business it presents

great opportunities for profit, particularly at the higher rates warranted by the more rapid service given, as compared to that of the steam railroads.

To determine questions like this a correct and comprehensive method of allocating the expenses between the probable early increase in steam railroad rates, is essential. But when this has been done and a decision has been reached no manager should remain under the delusion that the conclusion reached will continue indefinitely to be correct. Such an analysis must be made not once but periodically, as the costs of operation are constantly changing.

We believe, with Mr. Zinsmeister, that the present condition of freight congestion on the steam roads, with the probable early increase in steam railroad rates, makes the topic of very live interest to electric roads at present. It is also true that the recent expansion of the auto trucking business has increased the competition, especially for short distances. Probably the effect of these two factors has been to increase both the maximum and the minimum limits of profitable electric railway haul. In other words, the tendency will be for the electric roads to give up more definitely to the auto truck some of the shorter hauls heretofore found profitable by them and to reach out for certain of the longer hauls which up to this time have been considered to be exclusively the province of the steam road. If this view of the situation is correct, it emphasizes still more the necessity for a systematic and careful analysis of the costs of electric freight haulage.

How About Goods Distribution in Urban Communities?

CAN the electric railway help solve the problem of freight and express distribution from urban trunk line or waterway terminals? We believe this question deserves more serious study than has so far been given to it. The Chicago tunnel has, of course, long performed a useful service and Chicago's Loop District surface traffic problems would long since have been more serious than they are today without this agency. But this is a special case. Our question relates to combined use for passengers and materials. The electric railway, surface or rapid transit, now serves as a distributer for passengers, why not for goods?

New York City now is in a terminal crisis, aggravated by a trucking strike. Other cities have similar physical problems. The delays and consequent cost of surface distribution of goods is mounting enormously. A. H. Smith, president of the New York Central Railroad, recently estimated New York's *daily* loss due to improper terminal facilities as close to a quarter million dollars. The electric railways have facilities which might be utilized for a worthy service here.

What study or trial, for example, has been given to a utilization of the subway facilities for distributing goods from terminals to subdistribution centers? Can the express tracks be used at nights, with cars run off on spurs for loading and unloading? Can New York's elevated tracks be used at nights likewise? How about Chicago's elevated roads at nights for similar service? And Philadelphia's subway and elevated? And Boston's? And main artery surface lines in every other city of appreciable size?

It may not pay. But who knows? Any previous attempts or studies are out of date in today's economic world. We have generally assumed the urban electric railway's field to be for passenger traffic, but why should it not also be for goods traffic? We believe this is one way in which the gross business, and probably the net, of some railways can be increased. Is it not worth the time of some one to see if this business cannot be obtained, or, to put it another way, to find out if the electric railway cannot perform this service to the community?

Making the Life of the Joint Equal That of the Rail

IT IS GENERALLY conceded that the problem of rail joint maintenance is one of the most troublesome with which the electric railway engineers have to contend. It is becoming more and more clearly recognized that the requirements of modern traffic, especially in paved streets, demand both mechanically and electrically a continuous rail. Many miles of track have been constructed or reconstructed with welded joints of one type or another, in order to provide as nearly as possible a continuous rail, and many improvements have been made in the various methods of welding rails. These have resulted in a material reduction in the percentage of failures and have overcome defects in the original processes which caused many of the initial failures.

In numerous cases, particularly on the smaller properties where the joints to be welded are comparatively few, the cost of welding by some of the processes is prohibitive because of the high cost of transporting the necessary equipment to and from the work and because of its interference with the operation of the cars. Often it is neither convenient nor practicable to utilize some of these processes for ordinary repair or maintenance, because the work would have to be done during such hours of the night as traffic was off the tracks, and the charges for delays and moving time quickly increase the cost per joint where only a few joints are to be repaired. It was the result of such considerations as these that led to the development of the several types of small portable electric arc welding machines now on the market.

It is extremely important that the continuity of the return circuit be maintained at as nearly 100 per cent efficiency as possible, and comparatively inexpensive equipment has placed the accomplishment of this much-desired condition within the reach of even the smallest companies. The actual methods by which the work is accomplished with any given machine are many and varied, and without doubt the results obtained are equally manifold. Only by experiments along this line, however, can it be hoped to reach perfection, and it is with this thought that we are glad to give space in the columns of this paper to any method which has been tried out long enough to indicate that it results in success and is an improvement over a former method.

In these days of high cost of both material and labor, coupled with comparative inefficiency on the part of that class of the latter which most street railway companies are able to secure, the engineer and maintenance men must work hard to keep this cost within the limits of the amount set aside for the purpose. Experiments in arc welding of rail joints, therefore, must be conducted not only with the idea of reaching a higher degree of perfection in the results obtained but also with consideration of the cost of the completed job. It might be possible to obtain marked success in the mechanical results, while the cost of installing or of repairing the joints would be so high as to make it cheaper to install or repair the joints a second time by some less costly process.



SIX-CAR ELECTRIC TRAIN FOR BAKERLOO-WATFORD SERVICE

New Cars for the "Bakerloo" Line

The First Train for Joint Operation Over the Lines of the London (England) Electric and London & Northwestern Railways Has Been Placed in Service

THE first train has now been delivered on the joint order of the London & Northwestern Railway and the London Electric Railway, out of a total of ten multiple-unit trains of this type ordered in 1914. Each train will consist of six cars and will be made up of three motors cars and three trailers. The section of these new cars is made to conform to the dimensions of the "tube" of the Baker Street & Waterloo Railway, as they will operate through this tunnel as well as out into the country over the surface tracks of the London & Northwestern Railway.

The Baker Street & Waterloo Railway belongs to the London Electric Railway and, for brevity, is commonly referred to as the "Bakerloo." This is an underground tunnel line some 6 miles long running from the Elephant and Castle in South London to a junction with the London & Northwestern Railway at Queen's Park, Willesden, in the northwest of London. Some little distance before reaching the tracks of the London & Northwestern Railway the tube line comes to the surface. This extension and the making of a physical connection with the London & Northwestern line were completed two or three years ago, when the newly electrified tracks of the Northwestern company were finished. The electrified tracks of this latter company run out into the country as far as Watford, and the distance which the through electric trains will run from the Elephant and Castle to Watford is twenty-one miles. Direct current at 600 volts, with third and fourth-rail conductors, is employed. When these new cars were ordered in 1914 it was realized that additional rolling stock would be necessary in order to meet the growing requirements, but owing to delay caused by the war these cars are only now being delivered.

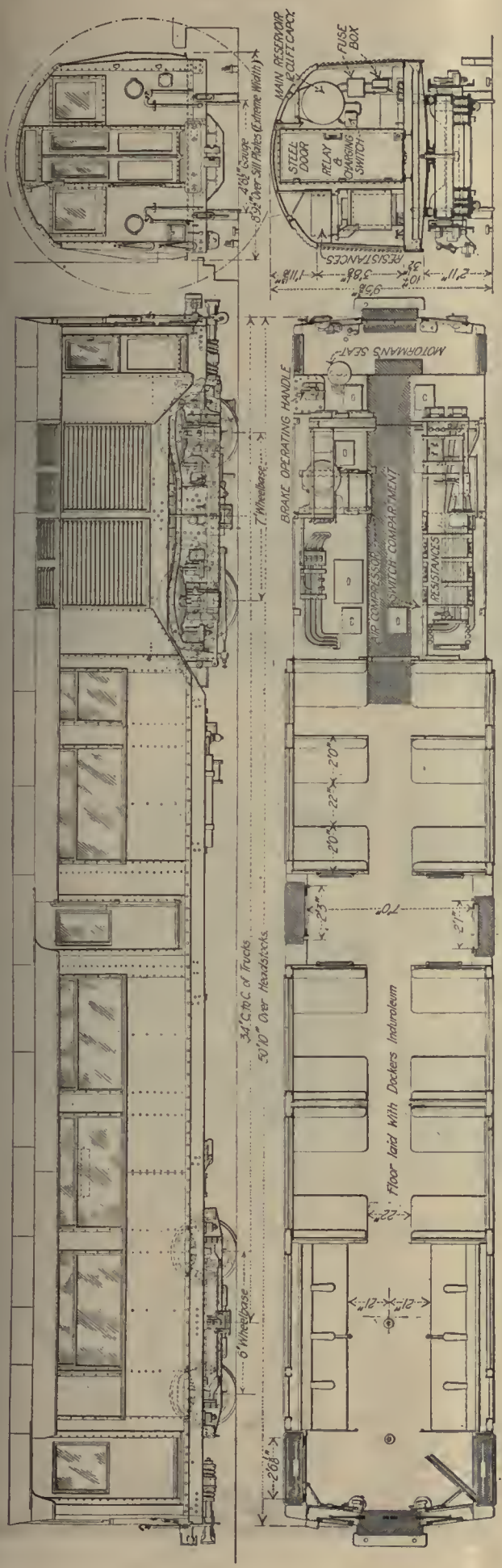
The new cars are being built by the Metropolitan Carriage, Wagon & Finance Company, Ltd., of Birmingham, and are entirely of steel. Both motor cars and trailers are painted with the standard London & Northwestern



VIEW OF MOTORMAN'S COMPARTMENT



CONTACTOR GROUP AND GRID RESISTOR INSTALLATION



ELEVATION, PLAN AND SECTION OF MOTOR CAR

colors, brown and white. In the interior the steel panels are painted cream color and the roof is of white asbestos millboard. Following are some of the dimensions:

Length over all	50 ft. 10 in.
Width over body	8 ft. 8 in.
Total height from rail	9 ft. 5¼ in.
Distance center to center of trucks	34 ft.
Wheelbase, motor truck	7 ft.
Wheelbase, trailer truck	6 ft.
Diameter of motor driving wheels	42 in.
Diameter of trailer wheels	32 in.
Weight of six-car trains without passenger loads	161 tons

Each motor car seats thirty-six passengers and each trailer car forty-eight, which gives a seating accommodation of 252 passengers per train of three motor cars and three trailers. Ample floor space is also provided so that a large number of standing passengers can be carried when necessary. A combination of cross seats and longitudinal seats is used. The seats are very roomy and are upholstered in red and black.



END DOOR CLOSING MECHANISM, WITH RED AND GREEN LAMPS ON PEDESTAL AT LEFT

As will be noted from the interior view of the car, no straps are provided for the accommodation of standing passengers. Near each end of the car two vertical rods run from the floor to the ceiling, one on each side of the door space. These give a hold for passengers standing near the vestibule. The cross seats, which are located a little farther along, are provided with grab handles at the aisle corners. At the center of the car there are short partitions on each side of the center doors and these are fitted with vertical rods, which passengers can grasp. It is believed that this arrangement will be much more comfortable for standing passengers than the strap-hanging arrangement previously used. The provision of hat or light-luggage racks is a novelty in tube car construction.

Hinged Doors Are Used

The subject of doors, which is always of importance, presents peculiar difficulties in the case of these cars. Owing to the shape of the upper part of the car body, which is necessary for clearance with the circular tunnel, it is impossible to have sliding doors unless they are placed inside at such distance as to leave a wide outside step. This would be a source of danger. It is necessary that the cars be constructed with no projections which might give a foothold for passengers, as they might get on this ledge while the train was standing at a station platform and as soon as the train started they would be instantly killed by striking the sides of the small tunnel, which begins immediately at the end of the station platform. For this reason previous tube rolling-stock, with one exception, has not been provided with center doors, and all loading and

unloading of passengers has had to be done through the doors at the ends of the car. To expedite entrance and exit of passengers and cut down the length of stops the center-door arrangement adopted for these cars was devised for the original Bakerloo and Watford cars and it has been followed with improvements in this new rolling-stock.

The shape of the car and the type of construction followed thus make it necessary for the doors to be hinged and they are hung to open inward. The end doors, which open onto a vestibuled platform, are worked by a gateman. The center doors cannot be opened unless the end doors are open, and when the latter are closed the center door is shut and locked. Thus the center door is completely under the control of the gateman. It is closed automatically by means of a spring under the car floor, but it is not locked until the end doors are closed. A signal lighting arrangement notifies the gateman when all doors are properly closed. Embodied in the pedestal which holds the mechanism for operating the end doors is a switch which controls the circuit governing the electric lock of the middle door. In this way when the gateman opens the end door he automatically unlocks the center door, and this fact is made plain by the lighting of a red lamp in the pedestal supporting the end-door mechanism. When the end door is again shut it closes the circuit which locks the middle door and a green lamp in the pedestal is illuminated. Should the end door be shut and the center door for any reason be not properly fastened the lamp in the pedestal will continue to show red until the door is properly locked.

STATION PLATFORMS OF THE TWO SYSTEMS ARE NOT OF THE SAME HEIGHT

An additional problem in connection with the operation of through trains was brought about by the different heights of station platforms. The platforms of the tube railway stations are much lower than those of the London & Northwestern Railway stations. In the cars which have hitherto been in this service a ramp was provided on the platform of the cars. This new rolling-stock, however, has been built with the floors 5 in. higher than the old cars, so that the new floor level is a compromise between the height of the two classes of station platforms. The result is that a passenger entering a car from a Bakerloo platform has to take a small step up, while passengers from a London & Northwestern platform have to step down. This raising of the car floor has permitted the use of 42-in. driving wheels instead of 36-in. wheels, as were used on previous types of equipment.

Each motor car is equipped with two British Thomson-Houston motors of 240-hp. capacity each, a total of



AT TOP, TRAILER CAR. DOOR ARRANGEMENT. AT LEFT, LARGE WINDOWS WITH HINGED VENTILATORS. AT RIGHT, CENTER DOOR CONSTRUCTION

1,440 hp. for a six-car train. The gearing provides for free running speeds of from 40 to 45 m.p.h. The trucks are built of steel plates and angles.

The particular type of Thomson-Houston multiple-unit control employed has not been used before in England except on some of the existing cars running on the Watford line. It is of the relay automatic type. In starting, the handle of the master controller is placed in either the full series or full parallel position and the contactors automatically notch up in their correct sequence to this position. A current-limit relay provides the notching arrangement and this operates whenever the motor current drops to a predetermined value. There is no bus line throughout the train, so that each motor car has a potential relay to drop off the contactors whenever the power circuit is opened. Westinghouse air-brakes with quick-action triple valves are used and the truck brakes are of the clasp type.

Both Center and Side Lamps Are Used for Lighting

Special care has been given to the lighting and ventilating systems. The illumination for each trailer car is provided by nine opal-bowl ceiling lamps and eight small auxiliary lamps located along the sides between the windows. The motor cars have but six of each type of these lamps, as the total area to be lighted is smaller due to the space taken up by the motorman's compartment. A very satisfying light is thus provided which is both strong and diffused. The diffusion is increased by the reflection from the white roof and the cream-colored sides. Emergency lighting is also provided. Current for this is obtained from a small storage battery, which is automatically switched on should the main current fail. Ventilation is provided by the top sections of the windows opening inward on hinges and by a perforated air duct which runs the length of the car.

A further comfort which is not usual in tube railway rolling-stock in England is the use of electric heaters. The temperature of these tunnels even in cold winter weather is never very low, so that it has not been the practice to heat cars used in this service. These cars, however, will be required to make part of their journey in a warm tunnel and the remainder of it in the open country. This change of temperature during frosty weather is irritating to passengers. Electric heaters have therefore been placed under each seat and these can be switched on by the trainmen when the trains are in the open and turned off again, if desired, when they enter the tunnel.

Convention at Bluff Point

New York Electric Railway Association Holds Annual Meeting at Lake Champlain, with an Attendance of More Than Two Hundred—Expenses of Interurban Freight Service Analyzed and Discussed

THE thirty-eighth annual convention of the New York Electric Railway Association, held at Hotel Champlain, Bluff Point, N. Y., was confined to a morning session, with a banquet in the evening, but there was a large and representative attendance and a number of important topics were discussed. In the afternoon the delegates divided to engage in golf and the annual game of baseball between two nines representing respectively the railway men and the supply men, while the ladies participated in a bridge tournament. The annual banquet was held in the evening. The attendance numbered about 225.

The business and technical session of the Association was called to order at 10:30 a.m. by President E. H. Maher, Jr., who summed up the work of the association during the past year in a brief presidential address. He explained that the past twelve months had brought better conditions to some companies in the State, but not to others. He hoped that the situation as regards higher fares which had occurred in the northern part of the State would find a counterpart later in New York City. He expressed appreciation for the services performed during the past year by the executive committee, which had been unstinted in its devotion to the cause of the association.

The report of the executive committee, presented by the secretary, explained that the association had been represented at several legislative hearings during the past session at Albany, and while the association had not been successful in securing the reforms desired the executive committee believed its efforts had not been in vain and at the next legislative session some relief would be granted. The secretary and treasurer reported thirty-five active members, ninety allied members and seven associate members in the association. The receipts, including the balance on hand at the beginning of the year, were $14,372; disbursements, $9,840, and balance now on hand $4,532.

The committee on military operations, which had done good service during the war, was discharged with thanks.

The report of the committee on standards was presented by W. G. Gove. The committee included, besides Mr. Gove, W. J. Harvie, B. Penoyer and J. S. McWhirter. In his report, which was supplemented by a verbal statement, Mr. Gove said the committee was convinced that more could be accomplished by co-operation with the American Electric Railway Engineering Association and in an advisory way with the manufacturers than by independent action. He said that standardization has an important place in the economics of railway operation, but that the most favorable time to secure results was when apparatus was being developed rather than later. He cited the case of the safety car and commended the manufacturers for what had been done in the way of standardization with that design of car. He expressed his belief that the engineering association would be pleased during the coming year to co-operate in any way outlined. The report was accepted with thanks.

The same action was taken with the report of the committee on membership, presented by H. B. Weatherwax, giving the record of changes in membership during the year.

COLLECTION OF REVENUE

Thomas P. Whelly, cashier New York State Railways, Utica, read a paper on the methods followed by his company so far as regards practice in the cashier's office, receiver's office, etc.

All the revenue from Utica city lines, Rome & Little Falls line, city of Oneida, city of Rome, Herkimer, Mohawk, Ilion and Frankfort lines is counted in the Utica city office. Seven of the city lines in Utica have pay-as-you-enter bank box collection.

All pay-as-you-enter boxes are padlocked to the car and all banks in the boxes have a stenciled number on the cover. This number is visible through a slot in the door so the conductor can make up his record. The conductors on these cars are provided with a bank of $6 for change, $4 in nickels and $2 in pennies, and all conductors are provided with city tickets. Change stations are maintained at junction points where necessary.

The banks in these fare boxes are removed by the receiver at the stations every night, and an empty bank is placed in the fare box as each car completes its run. The receiver makes a report of the number on each bank which he removes from the car and also the number of the bank with which he replaces it. The banks can readily be checked from this report each morning. An additional check of the banks operated is made by the accounting department from the conductor's reports. The receivers at the stations inspect all bank-box collection cars every night and report each car, showing the cars that are in the shop for repairs and those that have not been in service during the day. The cash boxes containing the money are placed in the receiver's cage at the station until morning, when they are brought to the office by two armed men in an auto truck. They are checked and opened at the office, the tickets are sorted from the money and the money is put into a coin counter, where it is sorted, counted and wrapped ready for the bank. It requires three men to perform these operations.

The receipts from the other city lines and the Rome & Little Falls line, which are open collection, are turned in by conductors at stations, upon completion of their runs, to the receivers, who check the receipts and give the conductors receipts for their money. This money is made up into a deposit by the receiver and placed in a leather padlocked money bag and taken directly to the bank in the morning by the same truck which calls for the boxes. A duplicate deposit slip with a statement of each conductor's turn-in goes to the main office, and later in the day this duplicate slip is receipted by the teller at the bank and becomes a permanent record.

The receipts from the Rome city, Oneida city and Herkimer, Mohawk, Ilion and Frankfort lines, which are open collection, are placed in canvas bags by conductors at their respective stations and deposited in safes which are equipped with a hopper top. Each morning these bags are removed from the safe by the division superintendent, who checks the number of bags with the number of runs operated the previous day and places them in a locked box, which he chains to the brake handle in the front vestibule of a regular passenger car bound for Utica. At Utica these bags are taken to the main office and are checked by two tellers. Each box has a blank receipt calling for the number of remittances in the box, and this is receipted by the teller who opens the box.

All express and ticket office receipts are put up in sealed envelopes by the agent in charge of each station and are collected each day by an express messenger, who gives receipts to the agents for them. These envelopes are brought to the Utica office, where they are checked by tellers. This money is then made up into a deposit and taken to the bank.

In Syracuse the system of handling the money is the same as at Utica.

There was no discussion of Mr. Whelly's paper.

A brief paper, on which there was also no discussion, on the reduction of transfer abuse was then presented by Charles A. Coons, general superintendent United Traction Company, Albany. His company, Mr. Coons said, serves a population of about 300,000 in Albany, Troy and neighboring cities. Several years ago the company put into effect a transfer giving the direction and also showing a map, and the issuing conductor was instructed to punch the points where the passenger boarded the car, where he changed cars and the direction he desired to go. This transfer was good for thirty minutes after the time punched. In most cases this meant unnecessary time, offering opportunities to the passenger to abuse the transfer privilege.

About five months ago a line-for-line transfer was substituted for the direction transfer, with the time limit reduced from thirty to fifteen minutes. The name of the issuing line is printed on the face of the transfer and the transfer points are printed on the back for the information of passengers. A transfer instruction book was issued to the conductors for their guidance in issuing and receiving transfers. On several lines where it is possible for passengers to make a round trip for one fare conductors were instructed not to issue a transfer, but to advise passengers to board a car going in the opposite direction and transfer to the line they wish to ride on, where such a plan would make it impossible for a passenger to make a round trip for a single fare. The new system was well advertised and was put in service on June 6, 1920. So far it seems to be giving general satisfaction.

COST OF INTERURBAN FREIGHT SERVICE

A paper on this subject was then presented by W. K. Zinsmeister, auditor and treasurer Rochester and Syracuse Railroad. It outlined a proposed system of freight accounts and will be found in abstract elsewhere in this issue.

In the discussion which followed, R. C. Cram, Brooklyn, referred to the high expense for track maintenance often caused by the operation over track of heavy freight cars. He said that some time ago the Brooklyn Rapid Transit Company had a contract with the city of New York by which ashes were hauled over its tracks to dumping points in 40-ton cars, and it was found later that the tracks leading to these dumping points and other tracks used extensively by these cars deteriorated more rapidly than tracks used exclusively by passenger cars. Mr. Cram said that the tendency in passenger car construction now was toward lighter equipment and consequently toward lighter track construction. Hence, any rate set up for the use of tracks by freight cars should include allowance for such additional wear as would be caused by heavy cars.

NEW OFFICERS ELECTED AND OTHER BUSINESS

Edward F. Peck, chairman of the nominating committee, then reported the following nominations, which were unanimously confirmed:

President, T. C. Cherry, Syracuse.

First vice-president, W. O. Wood, New York.

Second vice-president, B. E. Tilton, Syracuse.

Secretary and treasurer, W. F. Stanton, Rochester.

Executive committee, the officers and George Keegan, New York; W. J. Harvie, Auburn; W. G. Gove, Brooklyn, and E. J. Dickson, Buffalo.

The newly elected president, Mr. Cherry, after being escorted to the chair, expressed his appreciation of the honor of his election and asked for the co-operation of the members in carrying out the purposes of the association.

Mr. Peck then presented a set of resolutions expressing the grief of the association at the death during the past year of Edgar S. Fassett, past president of the association.

The resolutions said, in part:

The qualities of heart and mind, the genial, lovable personality which endeared him to all who knew him forbid that his memory should ever fade from our minds. The loss that we have sustained is irreparable, and by this memorial we record our sorrow at his demise and our appreciation of his services to this association and to the industry in New York State.

After the unanimous passage of this resolution and of one expressing the thanks of the association to the retiring officers for their services during the past year the meeting adjourned.

The Banquet

At the banquet in the evening two of the speakers who had been scheduled to present addresses were prevented at the last moment by circumstances beyond their control from attending, but sent letters which were read by the toastmaster.

One of these letters was from the Hon. John A. Barhite, a member of the Public Service Commission, Second District, State of New York, who explained that he was kept away by illness and then said, "My experience in the Public Service Commission for the past three years has made me deeply interested in the transportation systems of the country. We cannot do without them. Every citizen who has the future prosperity of the country in mind ought to recognize this fact and should be willing to lend a helping hand to promote the success of our steam and electric roads."

Hon. William B. Wilson, United States Secretary of Labor, who also hoped to have been in attendance, wrote, in part: "It would have been a source of very great pleasure and satisfaction for me to have been present at the banquet of the New York Electric Railway Association, because you gentlemen are engaged in one of the most important activities affecting the progress of civilization."

In spite of these absences a very acceptable program was provided and carried out. Retiring President E. A. Maher, Jr., acted as toastmaster and the two principal speakers were Douglas Malloch, president of the Chicago Press Club, and Senator Ashurst of Arizona. The address of the former contained many epigrams and hits on the foibles of the day. Senator Ashurst spoke of the basic nature, in our civilization, of transportation and the justice of rates which will yield a fair return to the investor. In this connection he said that the recent increase in fare in the city of Washington to 8 cents was not considered unreasonable there. The latter part of Senator Ashurst's address was an advocacy of a change in the Constitution of the United States by which future amendments to that instrument would have to be approved by popular vote.

Between the addresses of these two speakers Mr. Maher awarded the prizes for the athletic events of the afternoon. The golf prizes went to W. O. Wood and R. E. Hamilton, and a brown derby hat was given to Alex. Cameron as captain of the supply men's team, which won the baseball game in the afternoon.

Mr. Maher also read a telegram from the New England Street Railway Club inviting those present to join the outing of that club in Montreal on June 29-30. A similar invitation in behalf of the officers of the Montreal Tramways Company was warmly extended by A. Gaboury, superintendent Montreal Tramways and president Canadian Electric Railway Association, who was present at the banquet and urged those present to take this opportunity to visit Montreal.

A feature of the banquet was a number of choral selections given by a quartet made up of representatives of the United Traction Company of Albany, led by H. B. Weatherwax, vice-president of the company.

Report Issued on London Traffic

Needs for Centralized Regulation, Co-ordination and Better Fares Are Emphasized

THE Ministry of Transport, through its advisory committee on London traffic, has presented to Parliament a report which was adopted unanimously by the committee on March 18, 1920. The report first discusses work already accomplished in traffic control. The latter includes the special regulation of slow buses. Buses may no longer be hailed at any point but have four regular and two optional stopping places per mile. Efforts to reduce peak loads by staggering working hours have been inaugurated through the Treasury, the London Chamber of Commerce, the Early Closing Association and the National Union of Clerks. Pending the appointment of a permanent regulating body (traffic authority) by act of Parliament, the committee recommends the continued existence of an advisory committee, assisted by a technical committee, representing every interest.

PRESENT AND FUTURE NEEDS

Under this heading, the committee presented the accompanying table to show that London traffic has outgrown its facilities:

TABLE SHOWING LONDON TRAFFIC BY FORM OF TRANSIT

Form of Transit	Number of Passengers in Millions 1905	1914	1918	1919	Rides per Inhabitant 1919
Tube railways	69	147	254	266	36
District railways	56	85	133	140	54
Other local railways	180	172	223	253	
Total local railways	305	404	610	659	
Street railways	478	844	992	1,053	143
Motor buses	291	757	682	861	117
Grand total	1,074	2,005	2,284	2,573	350
Population in thousands	6,858	7,420	6,784	7,357	...
Riding index	157	270	337	350	...

In addition, it is estimated that during 1919 the suburban traffic on trunk lines was 486,000,000, thereby increasing the number of rides per inhabitant per annum to 413.

It is admitted that further growth of the private London transportation systems is impossible today be-

cause they yield an inadequate return upon investment and in some cases they are not even meeting their operating expenses. Generally speaking, each undertaking ought to pay its own way. This has not been the case with the components of the London combine (tubes, buses and suburban tramways which are under one ownership), and such a policy may not always be practicable. Nevertheless, the issue is raised anew when the suggestion is put forward that fares should be substantially increased on a paying system in order to help a poorly paying member of the combine. The committee is convinced that with proper legal safeguards and better co-ordination of the several modes of transportation co-operative financing is justifiable.

When it comes to providing new money for transport schemes of admitted public importance but doubtful financial worth it may be necessary for the state or municipality to render some aid, as implied by Section 17 of the ministry of transport act.

CLEVELAND'S FRANCHISE MENTIONED

In discussing fares, the committee notes that the present laws specify the maximum rates permissible on railways and tramways, but the only curb on the motor bus is that imposed by the rates of its regulated competitors. Regarding fare regulations in general, the committee makes this significant statement: "We do not suggest that the traffic authority should have the power to fix or vary fares, for the obvious reason that these control the methods of operation, and any traffic authority claiming powers to settle the terms on which passengers are to be carried must be prepared to subsidize or, in case of need, to operate." However, the committee adds that when important variations are proposed the regulatory body should have the right and power to call for the production of all books and to require personal inspection of operating methods.

The committee then refers to the Cleveland service-at-cost franchise, including the arrangement for a city traffic commissioner, and says: "This franchise has become noteworthy in the United States, as other tramway undertakings have adopted it as a standard to which they look for a solution of the difficulties now besetting them, and it may be that, in time, we shall have to contemplate the adaptation of this principle to London."

The committee recommends that a bill be placed before the House of Commons by the Ministry of Transport to embody the following points as a basis for reaching a conclusion: (1) The present value of the share capital on which a reasonable rate of return should be paid; (2) rate of remuneration considered reasonable; (3) percentage of increase in fares necessary to attain a sound operating basis.

In conclusion, the committee suggests the character of personnel desirable for a regulatory body, practically along the lines of American public service commissions (a chairman and two commissioners). This body would not have to deal with most of the obstructive veto powers hitherto exercised by the London boroughs, but as a body with delegated powers would be subject only to the veto power of the Minister of Transport.

An appendix contains detailed statistics covering the traffic and finances of the larger transport undertakings in London, including the London County Council Tramways. A notable item in these reports is that the present replacement cost of rolling stock would be two and one-half to three times the original cost. This condition, which applies also to other items, is a hard blow to the reserve and depreciation funds which had been set up on the basis of pre-war costs.

Energy Output Statistics

THE figures of kilowatt-hour output of public utility plants in the United States for the first three months of 1920 have just been published by the United States Geological Survey. The figures are based on the returns of about 2,800 power plants of 100-kw. capacity or more engaged in public service, including central stations, electric railways and certain other plants which contribute to the public supply. The capacity of the

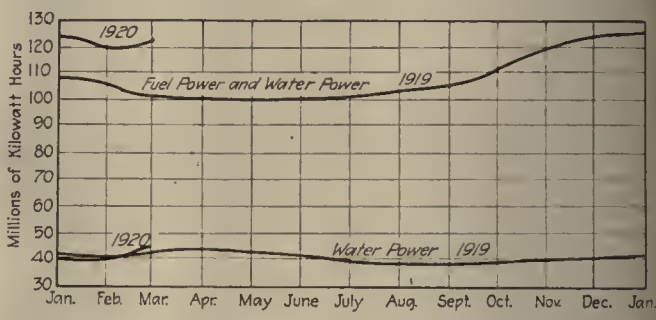


CHART SHOWING AVERAGE DAILY PRODUCTION OF KW.-HOURS BY PUBLIC UTILITY PLANTS IN THE UNITED STATES, 1919 AND 1920

plants submitting reports of their operations is about 90 per cent of the capacity of all plants listed. The average daily production of kilowatt-hours for the three months was as follows: January, 124,600,000; February, 119,800,000; March, 121,800,000.

The following figures relate to the year 1919: Total kilowatt-hours produced, 38,900,000,000, of which 37.9 per cent was produced by water power and 62.1 per cent by fuel. The total fuel consumption was: Coal, 35,000,000 short tons; oil, 11,050,000 bbl., and gas, 21,700,000 M. cu.ft.

Living Cost Doubled Since 1914

THE United States Department of Labor announced on May 2, 1920, that the cost of living in fourteen industrial cities of the country had more than doubled in the last five years, comparing the figures for December, 1919, with those for December, 1914. The highest percentage of increase was 107.87 for Detroit, with Norfolk second at 106.19. New York City ranked third with 103.81. Others in their order were Buffalo, 102.65; Jacksonville (Fla.), 102.14; Houston, 101.70; Chicago, 100.61; Savannah, 98.68; Baltimore, 98.40; Philadelphia, 96.49; Cleveland, 95.05; Mobile, 94.54; Boston, 92.30, and Portland (Me.), 91.59.

The accompanying table shows in detail the changes in New York year by year:

Items of Expenditure	Per Cent of Total Expenditure	Per Cent of Increase from Dec., 1914, to Dec., 1919				
		1915	1916	1917	1918	1919
Food	42.0	1.34	16.26	55.28	82.62	90.95
Clothing:						
Male	....	4.78	20.32	51.40	126.39	201 26
Female	....	4.87	24.73	57.63	137.15	234.97
Total	16.6	4.82	22.31	54.21	131.25	219.66
Housing	14.3	*0.10	*0.05	2.63	8.47	23.39
Fuel and light	4.3	*0.06	10.98	19.92	45 47	50.63
Furniture and furnishings	3.3	8.43	27.60	56.47	126 51	172.92
Miscellaneous	18.7	1.97	14.91	44.68	70.01	95.82
All items	....	1.97	14.91	44.68	77 28	103.81

* Decrease.

The Place of the Bus—V

Inherent Difficulties Concerning Satisfactory Motor Bus Regulation—Only Way Out Seems to Place Responsibility for All Mass Transportation Up to One Agency

By WALTER JACKSON
Consulting Engineer



A MOTOR BUS FOR CROSS-COUNTRY SERVICE

WE HAVE seen that more than fifteen years of motor bus operation in Great Britain has not yet led to legislation that places the electric car and the motor bus on the same plane of responsibility and taxation. It must not be assumed that this delay is due altogether to national inertia and that we Americans will settle our motor bus problems overnight. The fact is that the omnibus covers so wide a range, from the simple job of hacking from a railway station in connecting with each train to functioning exactly like a street railway, that adequate yet fair legislation is really difficult. A regulation concerning liability bonds, for example, might be absolutely fair and necessary to curb a city busman and at the same time be most unjust to the rustic operator who wants to give the public something better than two trains a day.

The fact that individuals can often run routes for less cost than a large organization discourages the formation of the latter, thus making regulation much harder. For example, a company with an established system of accounting could not readily deceive the municipality on so simple a matter as paying a fixed proportion of the gross receipts into the city treasury. On the other hand, it is impossible to supervise the doings of hundreds of individual operators, not only with regard to their earnings but with regard to their compliance with essential service and safety regulations. The individual ownership of the buses and the condition that they, at least temporarily, enhance the transportation service of the community also lead to a measure of public sympathy that makes motor bus legislation unpopular and its enforcement difficult.

Historically, of course, the bus is derived from the stage coach and the cab. In the old days all of these vehicles operated at fares and under conditions so different from those obtaining on horse and steam railways that no one thought of placing the two public services in the same category. But while the horse bus had to give way to the horse car, the wonderful improvement of the internal combustion engine, the development of the rubber tire and the advent of smooth, durable paving have made the line of enonomic demarcation between their power-driven successors much less distinct.

If, for example, the street car charges 5 cents and is available at five to twenty minute intervals for twenty hours a day it will suffer no harm whatever from a motor bus service which charges, say, 25 cents for a like distance and which is available only during hours that the operator himself selects. In this case it is clear enough that the busman is really a hackman and naturally is subject only to those demands concerning character, license and safety of vehicle that have been characteristic of stage operation.

Mark now the change in his status if he decides that it is more profitable to carry more passengers at the street railway rate. He is no longer a hackman, temporarily renting his vehicle for the exclusive use of the first patron or group of patrons. His vehicle becomes an omnibus—literally a *carryall*—whereby he not only cuts deeply into the earnings of the street railway but is also morally bound to accept the same obligations and burdens as the street railway.

The many novel problems involved in this transition, with its concurrent appeal to the public's appetite for low-cost service regardless of high-cost prices, are only now nearing solution in Great Britain. Yet the electric railways of Britain, so largely municipalized, did not have to meet the "Here's a chance to get square" tactics that are characteristic of conditions here. It simply has proved easier to control an industry which has a fixed track with some claims to right of way than one whose pathway is the common road.

The writer, of course, is aware of the mass of anti-jitney legislation that has been passed, amended and discarded since the coming of that jaunty vehicle in 1914. These anti-jitney ordinances, however, do not go

so far usually as to be a real handicap to the operators of thirteen to twenty-four seat buses in good short-haul territory. They are drawn up primarily against the small touring car, which is generally put out of the running by a $5,000 to $10,000 liability bond; not so with larger buses taking in $30 a day or more. Also, clauses concerning reliability of service are not readily enforceable against individuals who have no time-table departments to spread before a censorious public service commission.

In spite of the commendable co-operation that has been manifested recently between electric railways and civic committees, notably in the cities served by the Eastern Massachusetts Street Railway, there is no reason to expect the permanent elimination of the competitive bus through any other tactics than the giving of headways that are short enough to wipe out the jitney driver's margin of profit.

Nevertheless, as there is an ever-growing field for the motor bus used legitimately and used advantageously, it behooves us to study the general trend of motor bus regulation with a view to seeing what impositions an electric railway would be likely to bear if it undertook to operate co-ordinating services. To this end there is presented a summary of motor bus and motor truck legislation, based partly upon direct research by the writer in connection with studies for clients and partly upon the recent state by state compilation of vehicle charges issued by the American Electric Railway Association.

Great Variation in License Rates

The association circular indicates at a glance the total absence of any systematic or uniform state taxation. In South Dakota and Wyoming no registration at all is required, whereas neighbor Idaho has a scale reading: 30 hp. or less, $15; 31 to 40 hp., $20; 41 to 50 hp., $25; more than 50 hp., $40. One might look for more uniformity in the better-populated states where motor trucks and buses have been a factor for some time. Here we find that Maine is content with a flat charge of $10, that Massachusetts charges $5 for the first ton and $3 for each additional ton, that Vermont is kind to old customers by charging $1, 75 cents and 50 cents per horsepower for successive annual registrations, that New Jersey recognizes the existence of trailers and that Pennsylvania knows that a pneumatic-tired vehicle should be assessed less than one with solid tires. There is the widest diversity also in charging by the horsepower or by the ton. However, no matter what the method of charging, the assessments cannot be said to be onerous or in any likely proportion to the wear caused to the roadways if comparison be made with the British petrol tax and road upkeep charges (see Article II for details).

Some State Regulations in Detail

A step forward in differentiation between passenger and freight motor buses is presented by the Maryland law which became effective July 1, 1918. Vehicles weighing between 3,000 lb. and 7,000 lb., inclusive, pay annually $\frac{1}{16}$ cent per seat-mile operated, while those weighing more than 7,000 lb. are to pay $\frac{1}{8}$ cent per seat-mile operated. Thus a fifteen-seat bus coming in the first category and making 30,000 miles per annum would pay practically $300 or $600 for two such buses. A single thirty-seater would weigh in excess of 7,000 lb. and on the basis of $\frac{1}{8}$ cent per seat-mile would pay 30,000 multiplied by 5 or $1,500 per annum. This gives 5 cents per bus-mile for a thirty-seat vehicle, assignable largely to road upkeep, compared with less than 1 cent per mile for way and structure charges on one all-safety car system. On the same railway all taxes plus way and structure are still well below 5 cents per car-mile. So far as Maryland is concerned, therefore, large buses have little chance if in direct competition with modernized electric railways assuming worth while traffic density.

Reliability of service is also called for by specific co-operation between the Motor Vehicle Commission and the Public Service Commission. The latter authorizes operators to run over given routes and the former furnishes the necessary markers or plates. No deviation from the specified route or schedule is permitted unless authorized in writing by the Public Service Commission, a copy of the revised order going to the Motor Vehicle Commission, for the purpose of readjusting the charges. As previously observed, it is easier to enforce both of the Maryland regulations, namely, seat-mile charge and service responsibility, on a company than on the individual.

The freight motor bus law of Maryland says in effect that $\frac{1}{2}$ cent per ton-mile shall be paid for vehicles weighing 3 tons or less, $\frac{1}{16}$ cent per ton-mile for vehicles weighing 3 to 6 tons, inclusive, and $\frac{3}{8}$ cent per ton-mile for vehicles weighing more than 6 tons, carrying capacity included in all cases.

Although Providence, R. I., has a well-organized bus company in competition with the Rhode Island Company, over the same streets, there is no state or municipal law to regulate its operation as a public utility or to demand proof that public necessity and convenience require bus service. The Rhode Island Omnibus Company annually pays $50 per bus to the city, $10 to the State as registration fee for a 22.2-hp. vehicle and $20 as a State tax on public service vehicles. This gives a total impost of $80 a year for a twenty-three-passenger vehicle. A. Luff, president of this company, told the writer that he would be perfectly willing to pay the city a fixed percentage of gross earnings if permitted a monopoly of bus business.

So far as the State laws are concerned, the following charges are set forth for 1919: Registration fees, $5 for automobiles up to 15 hp., $10 for more than 15 hp. to 30 hp., $15 for more than 30 hp. to 40 hp. and $25 for automobiles in excess of 40 hp. Motor trucks of 1 ton or less pay $7, of 1 to 2 tons $10, of more than 2 to 3 tons $13, of more than 3 to 4 tons $16, and so on up to $40 for motor trucks in excess of 9 tons carrying capacity. Special permits are issued for trailer operation, $10 being charged for vehicles over 2 tons and not more than 5 tons, $20 for vehicles over 5 tons and not more than 10 tons, and $30 for vehicles more than 10 tons, load included in each case. One important rule with regard to the safety of electric railway passengers is that a self-propelled vehicle must not pass a trolley car stopped to receive or discharge passengers on the side between the car and the curb.

Connecticut State and City Practices

The motor vehicle laws of the State of Connecticut define a "public service motor vehicle" as including "any motor vehicle used for the purpose of soliciting and receiving passengers upon any public highway or carrying such passengers upon the payment of an individual fare, but shall not include omnibuses running regularly

between railway stations or boat landings and hotels." The registration fee for a public service motor vehicle seating five persons or less is $15, plus $2 for each additional seat in excess of five and including twenty; $5 for each additional seat in excess of twenty and including forty, and $10 for each seat exceeding forty. However, almost all jitney buses used in Connecticut seat less than twenty. These fees are in addition to the usual motor vehicle registration fee of 50 cents per horsepower.

Those who desire to operate public service motor vehicles must procure a certificate from the local chief of police or first selectman before the State Commissioner of Motor Vehicles grants the special license required in such operation. While the applicant has the right to appeal to the Commissioner if this local permission is not granted, it would hardly help his health to do so. In practice, therefore, the municipality can exercise considerable control over bus operations, as in the case of Bridgeport. The personal State license of the operator of a public service vehicle is $5.

Another part of the law, "more honored in the breach than in the observance," states that: "No public service motor car shall carry any person upon the running boards, mud guards or hood, nor shall the total number of persons carried at any time exceed two persons more than the regular seating capacity." It would be almost unnecessary to impose any other form of taxation if the penalty of $25 per offence were really collected. The rather involved rule about refraining from passing a street car which has stopped to take on or discharge passengers is another legislators' ideal quite unenforceable in practice.

The Connecticut law does not permit towns, cities or boroughs to regulate the speed of motor vehicles, their lighting and their accessories. The powers remaining are those that relate to sanitation, stoppage of all vehicles in the case of processions, parades, etc., and the establishment and enforcement of ordinances fixing traffic routes and public stands for public service motor vehicles. The speed regulations prohibit vehicles from passing a standing street car at more than 10 m.p.h., and of running in thickly settled portions at more than a rate of 20 m.p.h. for a quarter of a mile.

Operators of public service vehicles must display a State sign to show that they are engaged in jitney or taxicab service, and if in the jitney service the standard fare must be shown. The first violation of this rule brings a fine of $25 and a second violation brings indeterminate suspension. These signs are independent of the route signs such as are supplied through the Police Department of Bridgeport. The liability bond to be taken out with an approved surety company varies from $5,000 to $10,000.

Because of the extraordinary traffic development in Bridgeport, the chief city of Connecticut, the Board of Police Commissioners of that city had to adopt heroic methods to minimize congestion. The great traffic center of Bridgeport for every kind of vehicle is the intersection of Main St. and Fairfield Ave., respectively 34 ft. and 33 ft. narrow. No public service vehicle may be operated without the consent of the board. The police may refuse to issue a permit on the simple ground that a given route is already overcrowded and it may, and does, oblige the bus operator to run from terminal to terminal of the routes over which bus operation is permitted. In fact, the more important routes have starters to maintain proper headways. These starters are paid by the drivers. An early evil was the tendency of drivers to cut back in the very center of the city in order to confine their operations to the fat side of a crosstown route, but this is no longer permitted.

Until late in 1919 an approved operator could purchase three standardized route signs from the Police Department at $1.25 each and was at liberty to change over any time to any of the routes for which he had a sign. At the instance of the older and more conscientious operators an ordinance was passed specifying that a driver may obtain only one sign at a time and must give twenty-four hours' notice of a desire to change to another route.

In addition to the effective traffic control under the direction of Capt. Charles A. Wheeler, the Police Department also warns the operators on such matters as exhaust whistles and muffler cutouts. The popularity of jitney service at Bridgeport must also be due in good measure to the close scrutiny over the doings of the bus operators. Captain Wheeler, for example, keeps a continuous inventory of every man and his route.



A FIFTH AVENUE DOUBLE-DECK BUS

Even their visits out of town are noted, as when some adventurous ones left to try their fortunes on Mayor Hylan's New York lines.

Matters Mixed in New York State and City

Before adverting to the law surrounding de luxe and jitney motor bus operation in New York City a glance may be taken at a decision made by the Public Service Commission of the Second District (outside New York City) which vividly illustrates the dangers that must be faced by an electric railway because of the anomalous "is it a special service or is it a utility" position of the motor bus.

During the year 1916 a certificate of necessity and convenience to run a motor bus line was granted by the Public Service Commission to a realty organization in Albany known as the Woodlawn Improvement Association. In over-ruling the protest of the United Traction Company the commission said:

> "In the opinion of the commission, the consent of the city to the operation of a bus or stage route required by section 26 of the transportation corporations law is not the granting of a franchise within the meaning of section 37 of the second class cities law. It is more in the nature of a license, such as those issued to hackmen and others."

The railway had urged that the authority of the Common Council was not valid because the permit purported to be a franchise, and as such had not been sold at auction to the highest bidder as the law required.

The commission did not admit the railway's plea that this competition was unjust, because the proposed bus route was 2,500 to 4,000 ft. from the nearest street railway in a fast-growing residential section and because a street railway route for the same street had been urged in vain. Despite the fact that the bus route was to start at the Union Station, the city's traffic center, the commission would not take cognizance of the fact that the buses necessarily would pick up possible railway patrons who were not going to the locality for which this service was specifically desired. This is not mentioned in criticism of the commission but as a proof that electric railways cannot afford to let others do something that will cause the loss of short-haul riders when it can undertake co-ordination instead of competition.

The situation is decidedly confused as regards New York City. The original rights of the Fifth Avenue Coach Company were obtained as standard monopoly franchises granted jointly by the State and the city. Between 1900 and 1913 the State law was so worded that only previously existent companies (and the Fifth Avenue Coach Company was the only company) could apply for franchises with any hope of success. However, in recent years the Fifth Avenue Coach Company has extended its routes on the score of "emergency" permits from the city without the specified review by the Public Service Commission of the First District. This point was raised adroitly by W. P. Burr, when Corporation Counsel of New York City, in a hearing held before the Public Service Commission concerning the complaint of residents against the establishment of a municipal bus service via Eighth Avenue, Borough of Brooklyn. If the Fifth Avenue Coach Company could exceed an emergency permit (because of a Billy Sunday revival) by two years or more, he argued, the city itself surely had the same right when it came to serving people whose trolley routes had been abandoned or disrupted. A few weeks later the complaint was withdrawn.

The Fifth Avenue Coach Company pays a city tax of 5 per cent on its gross earnings, the local license tax of $20 per vehicle, the State license tax, income tax, property tax, etc. For the fiscal year ended June 30, 1919, taxes amounted to 6.02 cents per bus-mile. As the total earnings were 46.27 cents per bus-mile, taxes alone amounted to 13 per cent. It will be seen that the Fifth Avenue Coach Company has not been overlooked by city, State or nation.

In contrast we have the New York municipal buses. So far from paying anything into the State or city treasuries, they actually enjoy substantial subsidies. The Department of Plant and Structures, city of New York, which controls the service, furnishes the schedules, route signs, supervisory personnel, etc., without charge. The bus drivers carry no liability bond, nor does the city expect them to do so, because this scratch operation is confessedly temporary. The city on Friday, March 12, appropriated $1,140,000 for the purchase of 200 buses, so that the busmen can hardly be blamed for refusing to take out a bond costing close to $500. Responsibility for accidents lies definitely with the city.

Until jacked up by the Secretary of State, the municipal busmen had also refrained from paying anything to the State treasury. Under the New York law registration costs 25 cents per horsepower plus 40 cents for each $100 of original list price if the machine was made after Jan. 1, 1917. Grover A. Whalen, Commissioner of Plant and Structures, estimated on November 6, 1919, that the bus license costs would range from $15 for a five-passenger bus to $67.50 for a thirty-passenger bus. The driver's license would cost another $5.

California Sunshine Great Help for Automotive Vehicles

The combination of a splendid climate and excellent roads has led to a most extraordinary development of public utility motor truck and motor bus services in California. As this development has also accelerated automotive legislation, some regulations can profitably be presented as indicative of legislative needs that will have to be met in other States. Fortunately, there is at hand for this purpose an article on "Passengers and Freight Carried More Cheaply by Motor Transport than by Railway," by K. Q. Volk, published March 18 in the *Engineering News-Record*. An abstract of part of Mr. Volk's article follows:

Under Chapter 213 of the Laws of 1917 the California State Railroad Commission received jurisdiction over all public utility motor vehicles operating between fixed termini, one or both of which are outside the incorporated limits of a city or town. The commission may fix rates, classifications and rules and regulate the accounts, service and safety of such companies, which jurisdiction shall supersede any conflicting jurisdiction exercised by municipal or county authorities. This act, amended in 1919, further provides that any one desiring to engage in stage or truck transportation between fixed termini must obtain a certificate of public convenience and necessity from the Railroad Commission. To secure such a certificate, the applicant must state the places and intermediate points between which he desires to operate, the proposed fares, rules and regulations covering service, copy of his proposed schedule, description of equipment to be used, name of company and its officials, name of line, steam railroads and electric railways operating between points he expects to serve and general conditions of operation and service upon which the applicant bases his justification for a certificate.

Holders of certificates are not limited by the commission, but may be locally, as to the amount of money they may borrow to develop business. The State demands no license fee for commercial motor carriers other than the annual registration fee demanded for all automobiles and trucks (40 cents per horsepower if pneumatically tired; solid tired vehicles less than 2 tons unloaded pay $5 more; 2 to 3 tons, $10 more; 3 to 5 tons, $15 more; more than 5 tons, $20 more).

The license fees charged by counties and municipalities vary from nothing to $200 a year for the initial vehicle and $25 for additional cars, the standard of the city of Ontario in the case of interurban service. Other communities base their rates on seating capacity, as Riverside, which charges $12.50 per seat per annum. Los Angeles charges interurban stages the following rates upon an annual basis (charges actually are made on a quarterly basis):

LOS ANGELES YEARLY CHARGES AGAINST INTERURBAN MOTOR BUSES

5 to 7 passengers	$27.00	16 to 20 passengers	$54.00
8 to 10 passengers	36.00	21 to 25 passengers	60.00
11 to 15 passengers	46.00	26 to 30 passengers	68.00

A quarterly rate of $1.50 per ton (annual rate of $6 per ton) or fraction thereof is charged for motor trucks operating as common carriers. The annual license fee for operating a ticket office and waiting room, as maintained by the larger companies, is $120.

Los Angeles County has adopted the following annual charge for each interurban stage and freight truck operated between fixed termini:

LOS ANGELES COUNTY CHARGES FOR STAGES AND TRUCKS

Interurban stages:		Freight trucks:	
Five seats or less	$18.00	1-ton capacity or less	$6.00
Five to twelve seats	24.00	1 to 2-ton capacity	9.00
Twelve to twenty seats	30.00	2 to 3-ton capacity	12.00
More than twenty seats	36.00	More than 3 tons capacity	15.00

There is also an almost uniform regulation in cities and counties which requires automobile stage companies to file an indemnity bond of $10,000 for each vehicle operated. The recovery under such a bond is usually limited to $5,000 for the injury or death of one person, $10,000 for the injury or death of two or more persons in the same accident and $1,000 for injury of or destruction to property. The rate for liability insurance on interurban stages varies from $150 to $216 a year according to seating capacity.

Mr. Volk says he cannot find that any money collected from licenses by cities or counties is returned to a road fund. All money received from license fees by the State goes into a motor vehicle fund. One-half the remainder of this fund after paying administrative expenses goes to the counties from which the money was collected for the purpose of road construction and maintenaance.

Mr. Volk notes that competition with the other carriers has led to a serious situation. All interurban stages are said to be giving quicker and more frequent service at lower rates than rail carriers. Routes up to 60 miles in length with sixteen to twenty-five-seat vehicles have proved the most satisfactory, and for still longer runs vehicles of nine to twelve seats are most popular. Most of the twelve-seaters are standard second-hand seven-seat passenger cars rebuilt and lengthened. It is stated that many of the interurban stage companies were not a success at first, owing to the competitive conditions, need for creating traffic and failure to use standard equipment. A table in Mr. Volk's article showing the principal stage companies operating out of Los Angeles and the rates of the railways with which they compete was published in the ELECTRIC RAILWAY JOURNAL for May 8, 1920.

Passenger transport has grown faster than freight despite the expenses enumerated. Late in 1918 the automotive interests formed the California Highway Association for general co-operative purposes, including encouragement of laws to put them on the same basis as other common carriers. Cost of membership is $10 a year for the first car and $3 a year for each additional car.

In Illinois motor vehicles may be registered locally. A motor bus can be run in the city of Chicago for an annual license fee of $30, but the bus company must first obtain a certificate of convenience and necessity from the Public Utility Commission of Illinois. In the case of the Chicago Motor Bus Company, permission to operate on the north side had to come also from the Commissioners of Lincoln Park because part of the run is over a parkway.

The total taxes paid by the Chicago Motor Bus Company have been on the order of 2 cents per bus-mile, as revealed by reports made during 1918 and 1919. This is equivalent to a range of 4 to 7 per cent of the gross earnings.

The latest de luxe 10-cent service is that of the St. Louis (or Missouri) Motor Bus Company, which inaugurated service on Feb. 10, 1920, with nine double-deck buses. The company agreed to pay the city a license fee of $25 per vehicle and 5 per cent of the gross earnings. The State registration fee ranges from $2 for motor vehicles of less than 12 hp. to $12 for motor vehicles exceeding 72 hp.

In addition to New York, Chicago and St. Louis, negotiations are under way with the municipalities of Newark, Philadelphia and other places for similar services. The ever-rising cost of labor and material as against the fixed 10-cent fare, however, is not encouraging to the development of supplementary services unless conducted by the existing electric railways.

The following and concluding article will be devoted entirely to costs—from the humble, second-hand one-man car to the imposing vehicles known to Fifth Avenue and the Lake Shore.

German Electric Tramways

AN EDITORIAL in a recent issue of the *Electrical Review*, London, summarizes the plight of electric tramways in Germany, stating that the situation with regard to many undertakings is now becoming desperate. The chairman of one of the principal manufacturing companies, which is also interested in a number of tramways, recently stated that nothing further could be gained by increasing fares. This statement is more than confirmed by the directors of a tramway in Rhineland. They point out that it has been necessary to have recourse to raising fares in order to meet the increase in working expenses, but in this respect they have been opposed by the local authorities, who have placed great difficulties in the way of introduction of higher fares. On the other hand, the municipal tramway fares have been advanced time after time, and in some cases the municipal councils have also increased the taxes in order to endeavor to relieve the tramways at the expense of the taxpayers in general.

It is now proposed to attempt to solve the question of fares by arbitration, as in the case of the fixing of charges for the supply of energy, but experience has shown lately that the increases in fares, far from yielding a larger revenue, are actually resulting in a decreased income.

Continuing, the editorial says that the new advances made in the prices of coal with the consequent rise in the prices of materials, etc., will further prejudicially affect the working of the tramways. The charge made for power before the war to tramways not owning their own generating stations ranged from 5 to 10 pfennigs per kilowatt-hour; it now amounts to from 40 to 50 pfennigs, and will further advance in the next few weeks. The introduction of minimum fares of 60, 70 or even 80 pfennigs has been discussed by a number of tramway managements, but these have been vetoed by municipal bodies on the ground of political consideration, recourse being again had to the indirect method of increased taxes. The price of tramway rails, which amounted to 139 marks per ton at the outbreak of the war, reached 300 marks in March, 1919, and is now 3,200 marks. Copper has risen from 1½ to 62 marks per kilogram, and the cost of a motor tramcar from 15,000 to 200,000 marks.

Super-Power Scheme for Holland

THE acute fuel situation in Europe is evidenced by the many electrification projects that are now being initiated. Holland, through a committee formed by the Society of Directors of Electricity Supply Undertakings in Holland, has been investigating a proposal for making a national electrical power supply for industrial and transportation uses in order to reduce the national consumption of fuel and the cost of power. The project is estimated to cost about $50,000,000 and much of the equipment must be purchased abroad.

The committee advocates the adoption of a minimum voltage of 50,000 and three-phase, 50-cycle current for the high-tension network. The network is to be supplied by power stations of 30,000 to 75,000 kw. capacity, using 15,000-kw. generators. It is estimated the country will need about fifty transformer substations, situated about 15 miles apart, feeding into 10,000 volt-distribution cables.

The scheme calls for state administration of the system and the taking over of existing plants. A stock company, with the government owning a large share of the stock, is one method advocated for carrying out the project.

The total load on the system is expected to be about 3,500,000 kw., with an annual output of about 1,000,000,000 kw.-hr., which will mean a power consumption of about 100 kw.-hr. per inhabitant per year, as against 40 at the present time.

The above figures are based on no electrification of the railroads or steam railways. It is estimated that an additional 200,000 kw. of station capacity will be needed in the next twenty years to carry this load. The road from Brussels to Antwerp is expected to be the first electrified.

At the present time the maximum load on the power stations is about 100,000 kw. with an annual output of 250,000,000 kw.-hr., so that the immediate development contemplates the expenditure of only about $16,000,000 to purchase and co-ordinate existing plants and construct some badly needed interconnected transmission lines. The future development also depends on the developments occurring in adjacent coal regions, such as in the South Limburg district, as it may be cheaper to use high-tension lines with power plants in the coal regions than to develop the scattered power plant scheme. The committee considers it cheaper at present to transport the fuel than to use transmission lines excepting in the case of very low-grade fuel.

Austrian State Railways to Electrify

THE Austrian Railway Ministry through its electrification division has recommended the electrification of 1,000 miles, or 40 per cent, of the state railroads.

Austria has an estimated undeveloped water power of 2,000,000 hp. and the electrification plan calls for the immediate electrification of roads near easily developed water powers and distant from the coal fields. The state hopes to have 400 miles completed in the next seven years, as the present state of exchange permits of obtaining labor at a very low rate and at the same time the electrification will afford an opportunity for employment during the period of national industrial stagnancy.

The fuel situation in Austria is very acute as the available coal is very poor in quality and constantly increasing in price. The state estimates a saving of 30 to 50 per cent in national fuel consumption, using the pre-war consumption as a basis for the estimate, through the projected water-power development.

The cost of the electrification contemplated during the next seven years is about $16,500,000 and financial assistance is being solicited from neighboring states, as Austria is in a desperate economic condition. It is estimated that if the construction were done in Switzerland the cost would be $80,000,000, due to the different labor and exchange conditions, so the Austrian government desires to take advantage of this situation to start work immediately.

A. E. S. C. Activities

IN THE report of the meeting of the American Electric Railway Association executive committee, given in the June 26 issue of this paper, the statement was made that the association will apply for representation in the American Engineering Standards Committee. This fact makes it desirable that all members of the association should be familiar with the plan and scope of the work of this committee. Its organization and early progress were covered in the issues of the paper for March 1, 1919, page 407; May 3, page 859, and June 7, page 1,100. Since the last report was printed the committee has established offices at 29 West Thirty-ninth Street, New York City, in charge of Dr. P. G. Agnew, formerly of the staff of the United States Bureau of Standards, as secretary of the committee. During the spring of this year Dr. Agnew represented the committee at the Brussels (Belgium) meeting of the International Electrotechnical Commission. During his trip, covering eight weeks, he personally investigated the work of the foreign prototypes of the A. E. S. C. and has issued a report of his investigations to the members of the committee. These foreign bodies were as follows: Association Belge de Standardisation (Belgium); Commission Permanente de Standardization (France); Hoofdeomissie voor de Normalisati in Nederland (Holland); British Engineering Standards Association. Dr. Agnew reported that the national engineering society of Italy is also forming a national engineering standards organization.

Bulletins are now being issued from the New York office at frequent intervals. Recent ones show that:

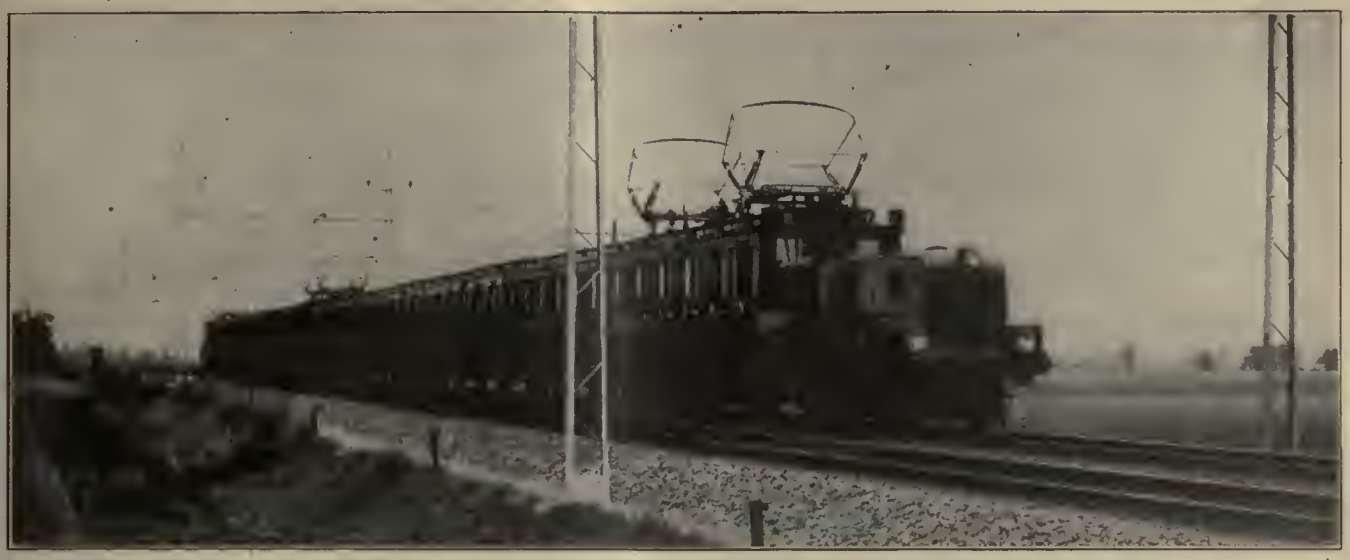
1. The A. S. M. E. and the Society of Automotive Engineers have been requested to act as sponsors in the matter of international standardization of widths across flats on nuts and bolt heads, as proposed by the Swiss Standards Association.

2. A sectional committee on steel shapes was organized under the auspices of the A. E. S. C. at the instance of the Association of American Steel Manufacturers, which has formulated recommendations regarding Anglo-American practice regarding the rolling of angles, channels and beams.

3. The A. S. M. E. has been asked to act as sponsor in the standardization of pipe fittings and of shafting.

4. A sectional committee has been organized to undertake the standardization of plain, cylindrical gages for general engineering work, under the sponsorship of the A. S. M. E. and at the instance of the British Engineering Standards Association.

Besides the five founder societies (A. I. E. E., A. I. M. & M. E., A. S. C. E., A. S. M. E. and A. S. T. M.) the committee now includes representatives of the Electrical Manufacturers' Council, the Fire Protection Group, the National Electric Light Association, the National Safety Council and the Society of Automotive Engineers.



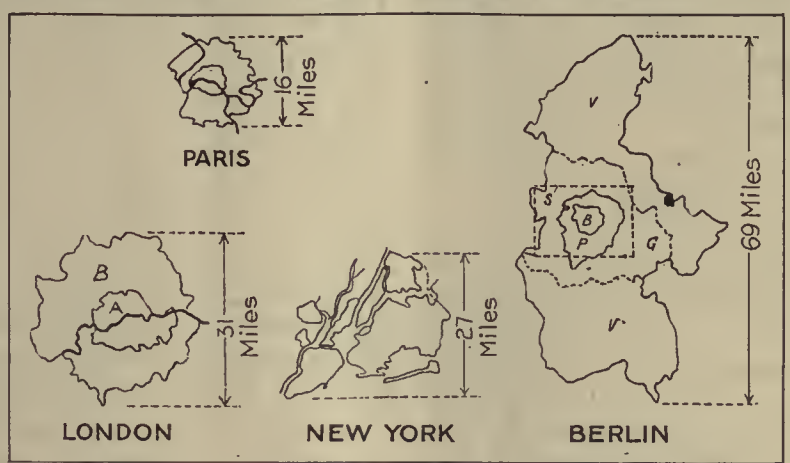
CAB-LESS SINGLE-PHASE LOCOMOTIVE, WITH CURRENT COLLECTORS, CONTROL EQUIPMENT AND MOTORMAN ON LEADING PASSENGER CAR, AS PROPOSED FOR BERLIN SUBURBAN AND CITY ELECTRIFICATION

Rapid Transit Development at Berlin

Electrification of City and Suburban Lines Contemplates Use of 15,000-Volt, Single-Phase, with Cab-less Locomotives and Power Generated from Gasified Fuel — Total Mileage Small in Comparison with New York and London — Enormous Increases in Fares to Meet Higher Costs

BY DR. E. C. ZEHME
Privatdozent at the Technische Hochschule, Berlin

SINCE 1911 the metropolitan district of Berlin, Germany, has possessed a regulatory body known as Verband Gross Berlin, formed to secure joint action by the city of Berlin and contiguous municipalities with regard to regulation of housing, of public parks as acquired and of all forms of traffic on rails. This arrangement of the associated municipalities applies to a metropolitan district of 1,355 square miles (3,512 sq.km.), which, as will be seen from the accompanying comparative chart, constitutes the greatest metropolitan area in the world. The dotted rectangle *S*, covering 252 square miles (652 sq.km.), denotes the rapid transit (subway, elevated and surface) proportion of this area, excluding street railways, buses and all but the suburban divisions of trunk-line railroads.



METROPOLITAN AREAS OF PARIS, LONDON, NEW YORK AND BERLIN, DRAWN TO THE SAME SCALE

While the rapid transit area of Berlin's metropolitan district is greater than that of other cities, its population is less. London had 7,500,000 inhabitants in 1914, New York had 5,450,000 in 1913 and Berlin had 4,136,000 in 1914.

A second chart shows the growth of the several forms of transit used in Berlin in the period 1870-1917. It will be seen that the street railways still carry about one-half the traffic. The steam Stadt and Ringbahn (City and Belt Railways), opened in 1882 and 1872 respectively, total only 30.5 miles (49 km.). The Stadtbahn serves the older and more thickly peopled sections, but the Ringbahn traverses some areas still in part unimproved. The steam suburban lines show the imposing total of 230 miles (370 km.), but most of their traffic is twice-a-day riding between Berlin and the more distant, smaller communities.

The Municipal Rapid Transit Lines and the Berlin Elevated & Underground Railway form so trifling a part of the total mileage that one need not marvel at their small share of the total traffic. Their total route length was 6.3 miles (10.2 km.) in 1902, 7.9 miles (12.8 km.) in 1907, 11.5 miles (17.8 km.) from 1908 to 1912 and 23 miles (37.5 km.) from 1914 to 1917. This is shamefully small in comparison with New York. One reason for this small mileage is the policy of the Berlin Elevated & Underground Railway, which endeavored to monopolize rapid transit development from the time of its formation in 1902 by preventing competition and by refusing to build any mileage itself that would reduce the density of traffic on the pioneer route. A second reason was the unwillingness of the municipalities in the metropolitan

district, because of political jealousies, to co-operate. A third reason was the difficulty of securing right-of-way through public and royal parks and of avoiding the yards of trunk-line railroads.

There are now under way—to be completed at some indeterminate period—12.5 miles (20 km.) of north-south rapid transit lines. This will bring Berlin's total to 35.5 miles (57.5 km.).

Greater Value of Time Makes More Rapid Transit Imperative

It is generally agreed that the rapid transit facilities of Berlin are inadequate. As the struggle for existence has grown sharper during the past decade, there has come an increasing recognition of the value of time. The waste of time now involved in going to and from employment, in handling mail and in transacting other business is well-nigh incredible. The rapid transit system itself is none too rapid. This is due in part to the loss of time to passengers in purchasing one of the great variety of tickets on this zone-fare and two-class system and to a poor arrangement of ticket booths, which is the cause of frequent congestion. Whereas the American rider usually tries to tender exact change, the Berliner generally offers a large coin or bill, so that it is not uncommon for a person to see one or two trains go by before he has been able to purchase his ticket and reach the platform.

New Routes and Electrification of Steam Lines the Remedy

The obvious way out is to electrify the present steam lines and to construct certain additional electric rapid transit routes. The accompanying map shows all rapid transit lines now in operation, under construction or planned. Of these lines it is noteworthy that the Stadtbahn reached the limit of its capacity two decades ago. As early as 1900 the Union Elektricitäts Gesellschaft, connected with the Thomson-Houston Company of the United States (General Electric Company successor), proposed the American plan of 500–600-volt direct-current third-rail operation with motor and trail cars. It is to be regretted that the government refused to approve this project despite the proof that similar electrification had been a success in the United States. The present attitude of the government in favor of high-tension single-phase is due to the fact that this system has been adopted as standard for the trunk-line service, and adherence to this system is considered desirable even in urban electrification. For all that, a direct-



MAP SHOWING STEAM RAILROADS AND EXISTING AND PROPOSED RAPID TRANSIT LINES IN BERLIN

1—Stadtbahn (steam).
2—North belt (steam).
3—South belt (steam).
4—Berlin Elevated & Underground Railway (electric).
5—Wilmersdorf-Dahlem (electric).
6—Schöneberg (electric).
7—Allgemeine Elektricitäts Gesellschaft (General Electric Company, electric).
8—City of Berlin (electric).
9—Potsdam-Stettin Railway Stations (electric).
10—Moabit-Treptow (Görlitz-Lehrt Railway Stations, electric).
11—Suburban Railways (steam).

current electrification of the year 1900 could have been readily converted to twice the original voltage with comparatively few substations regardless of the use of high-tension single-phase for the primary current. As a matter of fact, the Berlin urban and suburban network is entirely independent of the trunk line operation and could therefore use an entirely different system of distribution. Furthermore, no single system will give the power station the most economical load factor.

In 1913 the state railroads were authorized to spend up to 25,000,000 marks for work preparatory to the electrification of the Greater Berlin lines. The experimental work was to include studies in the gasification of coal, in the building of novel locomotives and in the development of new methods of transmission and distribution. Most of this appropriation was used up for these and other experiments, with no tangible results other than the structures erected for the work in coal gasification.

Gas Engines and Cab-less Single-Phase Locomotives

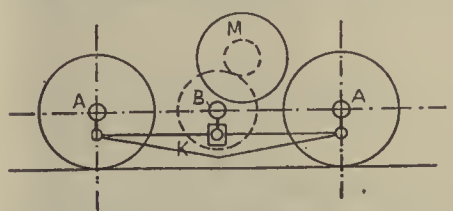
The power stations would use gasified lignite or peat, the gas driving engines being direct-coupled to generators. Part of the peak loads would be carried by steam turbo-generator sets fed from gas-heated boilers. The byproducts of the gasification process would be tar, fertilizer salts, fuel oil, lubricating oil, illuminating oil and pitch, while the exhaust of the gas engines would yield saltpeter (potassium nitrate). Pending the completion of these gas electric stations, of which two are under way, power will be purchased. The electrification of the Oranienburg and Bernau suburban lines lying north of Berlin is now in hand.

Locomotive drive will be used in order to retain the present rolling stock. These locomotives are of cab-less type, as the motorman and his control and current-collecting equipment are domiciled on the leading passenger car. There is to be one cab-less locomotive at each end of the train, as illustrated in the halftone engraving. During hours of light traffic trains would be split, the front locomotive acting as a puller and the rear locomotive as a pusher.

The advantages of this system, according to the railway management, are: (1) The retention of existing rolling stock; (2) simplification of transformer installation on vehicles; (3) less shock to the track because the motors, as shown at *M* in the diagram of motor drive, are mounted above the floor of the locomotive with jack-shaft *B* and side-rod *K* possessing a crank-to-link connection to transmit the motor drive to the driving axles *A*. Nevertheless, experience has shown that not only motor car trains but locomotives carrying heavy armatures on the axles have not suffered through any supposed lack of flexible suspension of the motors. Furthermore, corrugation cannot be due entirely to electric motor drive of any kind, inasmuch as corrugated rail has been found on track operated with steam equipment only.

The success of a cab-less, collector-less and control-less locomotive is very problematical, but the plan is to be carried out nevertheless. The cost of installation and operation will offset the saving in rolling stock. Since the tractive effort is confined only to the locomotives and since these are too light to attain a rate of acceleration of say 0.7 meters per second per second (1.56 m.p.h.p.s.), as used on other rapid transit lines, one must be satisfied with the low range of 0.25–0.3 meters per second per second (0.55–0.68 m.p.h.p.s.). This means that the number of trains per hour could not exceed thirty-five to thirty-seven, compared with forty-two motor car trains in the same period.

The locomotive outfit is also 54 metric tons heavier than a single-phase motor car train and 84 metric tons heavier than a direct-current multiple-unit outfit, which differences in weight will increase power expenditures by a sum equivalent to interest charges on an investment of 30,000,000 marks, assuming the use of single-phase, and to fixed charges of 50,000,000 marks as compared with direct-current multiple-unit operation. These figures are conservative. In practice, the disadvantage of the drive adopted would probably be greater still.



SCHEME OF DRIVE FROM MOTOR ABOVE FLOOR, USED ON BERLIN CAB-LESS LOCOMOTIVE

CHART SHOWING PASSENGERS BY VARIOUS FORMS OF TRANSIT IN BERLIN FOR THE PERIOD 1870-1917

Rack Gearing Tried to Increase Acceleration

In order to overcome the handicap of a very low rate of acceleration, with its limitation of headway to a maximum of thirty-seven trains an hour, the Ministry of Railways conceived the extraordinary plan of equipping the stations as rack railways with cog wheels on the locomotives, similar to the arrangement used on mountain railways with steep grades. About 1,000,000 marks were spent in experiments which are asserted to have been successful, but the idea was dropped because of the criticism which it aroused. However, the cab-less locomotive idea still lives, although it is obvious that with the rack expedient eliminated an economical rate of acceleration is out of the question. All that can be done now is to watch and wait upon the action of the Ministry. Probably the locomotives will be withdrawn from passenger service some day and placed in freight service elsewhere, whereupon the operation of

the Berlin lines will be carried out uniformly with multiple-unit motor car and trailer combinations. The history of the Central London Railway will be repeated.

It is proposed to use Diesel locomotives on sections where the loads are heavy but where there is no great density of traffic. On the other hand, motor car trains are considered necessary for lines with highly fluctuating traffic. The greatest confusion of thought appears to exist in connection with all of these questions, although the rest of the world seems to be pretty clear as to what is best for city and suburban electrification. Within the last few weeks (early in 1920) the locomotives have been subjected to further experimentation. It has been suddenly discovered that some form of hydraulic transmission, as devised in Germany for automobiles, ought to be tried for transmitting the torque of the motor to the driving axles. Should this succeed the inventors hope that they can substitute for the present commutator-type single-phase motor an asynchronous single-phase motor whose stator would take the 15,000-volt line potential direct and at a higher periodicity. If a 50-cycle instead of a 16⅔-cycle motor could be used special power-house equipment for railway purposes would be unnecessary. Experiments with this innovation, of which more particulars later, will assuredly cost a lot of money and delay electrification still further.

The Electric Rapid Transit Lines

The first of Berlin's electric rapid transit lines was opened in 1903 by the Berlin Elevated & Underground Railway. The parent line, indicated as "4" in the general map, runs west-east, with a branch midway leading north-west from Potsdamer Platz to Alexander Platz. This has always been a densely traveled and profitable route. By 1913 line 5 to Wilmersdorf and line 6 to Schöneberg, both westerly routes, had been added, while the original line had been extended from Alexander Platz as far as the North Belt of the steam system. All these routes run to Potsdamer Platz, the traffic center of Berlin.

A central north-south line is still lacking. The first proposition, as made by the Continental Company for Electrical Undertakings, associated with Schuckert-Nurnberg, contemplated the use of a suspended monorailway. The experimental section built proved the adaptability of this construction for narrow streets. The line was not constructed, however, owing to the opposition of the city authorities and the competitive project of the Allgemeine company, which had laid out exactly the same route as shown by line 7 in the map. Had the suspended railway been approved it could have been completed during the war and given service to eastern Berlin at very low fares. Instead, the Allgemeine company's plan, involving considerable subway work at about four times the cost, was accepted by the city. It was impossible to complete this during the war. Today it lies like a torso which can be completed only at an enormous cost which the contracting company is unwilling to undertake.

A second north-south line, 8 in the map, serving Friedrichstrasse, the busiest street of Berlin, was begun before the war by the municipality itself. This line is progressing slowly. Both the Allgemeine and municipal lines are very costly to construct because of heavy street traffic and sub-surface piping, aside from the increases in cost of material and labor over pre-war estimates. In view of the fact that the original rapid transit system is charging three times the pre-war rates of fare, the fares on the later and costlier lines may be expected to be exceptionally high.

In accordance with a recommendation of the Associated Municipalities, the preceding lines 4, 5, 6, 7 and 8 are to be lengthened as shown in the map. The board also suggests the construction of line 9 to connect the important Potsdam and Stettin railway stations and 10 to connect the Goerlitz and Lehrter railway stations.

The Associated Municipalities have laid down the following fundamentals with regard to rapid transit routes: (1) Lines must not be radial, but must run across the city from suburb to suburb; (2) the lines must follow the principal thoroughfares of the inner city; (3) routes must be evenly distributed within the residential areas; (4) branches within the central district are to be avoided; they are in place only in the suburban districts, where they can act as feeders to the trunk line. To aid in planning such projects, the Associated Municipalities have worked up considerable data regarding the density of population and riding characteristics of the different districts.

Curacao Antedates Ford

THE accompanying photograph shows a gasoline street car in a street of Curaçao, Dutch West Indies, a city which is of special interest because it is one of the places to which it was proposed to send the ex-Kaiser



Photo by Dr. Pobst, supplied by International Film

GASOLINE-DRIVEN STREET CAR IN CURACAO, DUTCH WEST INDIES

to spend his days in exile—far from Potsdam and his beloved wardrobe of brilliant uniforms. Possibly this railway line could supply valuable information in connection with Mr. Ford's proposal to equip interurban and city cars with gasoline motive-power equipment.

Steam Railroad Electrification in Spain

E. N. CHASE of the Ohio Brass Company has spent the last two years in Spain electrifying a short steam road between Masef and Candes along the northern coast of Spain. Parts of the line run along the seacoast. The track is of 60-lb. rail, ballasted with hand-broken stone. The overhead is catenary construction, No. 0000 copper contact wire with ⅜ steel massenger, suspended from pole brackets and cross spans. The cars are fitted with the bow trolley, the bodies being of local construction, but mounted on American trucks carrying American motors.

A.S.T.M. Holds Interesting Meeting

Many Specifications of Interest to Electric Railways Were Adopted and That for Quenched and Tempered Carbon-Steel Axles Is the Same as That of the A. E. R. E. A.

THE twenty-third annual meeting of the American Society for Testing Materials was held June 22-25 at Asbury Park, N. J. Covering as it does the general subject of specifications for all constructional materials and being made up of both producers and consumers, its standards are becoming quite generally recognized as authoritative and the proceedings of the society are of interest to electric railway engineers.

The question of the proper nomenclature of different alloys was reported on by the committee on non-ferrous metals and alloys. This committee has been working with the committee of the British Institute of Metals on this subject. They recommend that wherever possible the commercial names which have become established by long usage, such as brass, bronze and cupro-metal, should be retained.

The proposed nomenclature of non-ferrous alloys is as follows:

Brass—1. The term "yellow brass" shall be used for zinc-copper alloys only containing from 63 to 80 per cent copper and having a yellow or brass color.

2. The term "red brass" shall be used for zinc-copper alloys only containing more than 80 per cent copper in which the color varies from a golden to a copper red.

3. The term "yellow red brass" shall be used for zinc-copper alloys only containing from 55 to 63 per cent copper, in which range the brass has a yellowish red color.

4. Lead Brass. Brass containing more than 0.50 per cent of lead shall be known as lead yellow, red or yellow-red brass, according to the percentage of copper it contains.

5. Tin Brass. Brass containing more than 0.25 per cent tin shall be known as tin yellow, red or yellow-red brass, according to the percentage of copper it contains.

6. In cases where other metals are added these shall be designated by the use of the proper prefix or prefixes.

Bronze—7. The term "bronze" shall be used for tin-copper alloys only containing over 50 per cent copper. In cases where other metals are added these shall be designated by the proper prefix or prefixes.

Cupro-Nickel—8. The term "cupro-nickel" shall be used for nickel-copper alloys in which copper predominates.

Nickeline—9. The term "nickeline" shall be used for nickel-zinc copper alloys only.

These are the materials known generally as "German silvers," a false designation, for, as one member wittingly remarked in the discussion, "there are none of them silver and many are not German."

An interesting paper was presented on fatigue and impact fatigue tests of aluminum alloys, particularly "duralumin," in the summary of which the author states: "In comparing the fatigue-resisting properties of forged duralumin with those of the common grades of steel forgings the conclusion is drawn that for sections of equal size the aluminum alloys are equal to, if not superior to, forged steel.

The composition of "duralumin" is approximately: Copper, 3½ per cent; iron, ¾ per cent; silver, ½ per cent; magnesum, ½ per cent; manganese, ½ per cent.

One of the most important reports presented at the meeting was that of committee A-5 on "corrosion of iron and steel." This gives the results to date of the test which has been under way in Pittsburgh since Dec. 12, 1916. In this test sheets of varying compositions were exposed to the weather, standing vertically in fence fashion. The particular purpose of the test was to determine the relative resistance to corrosion of sheets having percentage of copper over 0.15 per cent (known as "copper bearing") compared to those having less than 0.15 per cent copper (non-copper bearing). While no conclusion is drawn by the committee, it is evident from the figures and photographs given that the copper-bearing sheets, no matter whether of iron or steel, are markedly superior to the non-copper-bearing sheets in their resistance to corrosion. While the test is not complete, it has progressed far enough to indicate this fact, and therefore this test may be considered of far-reaching importance. The committee now proposes to ascertain the effect of exposure to running water.

The committee A-2 on wrought iron presented a series of definitions for puddling, busheling, fagoting, muck bar or puddled bar, common iron, merchant bar iron, refined bar iron or refined wrought iron bars and double refined iron.

An exceedingly ingenious method of testing galvanized castings was the subject of a paper by Dr. Allerton S. Cushman. This "depends upon placing on the surface to be tested of a tinned iron ring properly shaped to fit any given surface, corrugated or otherwise. The ring is stoppered with a soft rubber stopper, thereby making a cell by means of which a hydrochloric acid, antimony-chloride solution can be run onto the surface and the resulting hydrogen which is formed by the reaction of the acid or the zinc can be collected and measured. A tight contact is preserved between the bottom of the metallic ring and the galvanized surface by using plastic modeling clay."

The advantage of the method is that it can be used in the field as well as in the laboratory and will determine the weight of the galvanized coating on the unit area regardless of the convolutions or corrugations, as, for instance, in a finished corrugated culvert, or roofing and sheathing metal.

An important feature of the society's work during the past year has been in connection with its membership in the American Engineering standards committee. The constitution of the committee has been revised (Aug. 16, 1919) to provide "for the admission of additional societies of national scope." A copy of the revised constitution is given in the report of the executive committee of the A. S. T. M.

Two A. S. T. M. standards were adopted as tentative American standards by the standards committee, *viz.:* Specifications and tests for portland cement and specifications for fire tests of materials of construction.

In addition to the foregoing, committee A-1 on steel recommended the following specifications to the executive committee of the A. S. T. M. for submission to the American Engineering standards committee as American standard: For carbon-steel and alloy steel blooms, for billets and slabs for forgings, for carbon-steel and alloy steel forgings, for quenched and tempered carbon-steel axles, shafts and other forgings for locomotives and cars, for quenched and tempered alloy-steel axles, shafts and other forgings for locomotives and cars, for carbon-steel forgings for locomotives, for carbon-steel

car and tender axles, for cold-rolled steel axles, for cold-drawn bessemer steel automatic screw stock, for cold-drawn open-hearth steel automatic screw stocks.

The second item on this list, namely, that for quenched and tempered carbon-steel axles, will be of interest to electric railways in that this specification had its inception in one of the large Eastern traction systems and then became the standard of the American Electric Railway Engineering Association. In modified form it was later adopted by the American Society for Testing Materials, which now is about to recommend its adoption as American standard. This should be and properly is a matter of congratulation to the American Electric Railway Engineering Association on the probable adoption of a specification for which it is responsible as one of the first American standards.

Committee A-1, as usual, presented an elaborate report. Certain minor revisions were recommended and accepted by the convention and will be published as tentative for one year covering the following specifications:

1. For quenched high-carbon steel splice bars; 2, for quenched carbon-steel track bolts; 3, for quenched alloy-steel track bolts; 4, for steel screw spikes; 5, for structural steel for locomotives; 6, for structural steel for cars; 7, recommendations with respect to normalizing of cold-drawn rivet bars, affecting the following specifications: (a) structural steel for bridges, (b) structural nickel steel, (c) structural steel for buildings, (d) structural steel for cars, (e) rivet steel for ships, (f) boiler rivet steel; 8, for lap-welded and seamless steel boiler tubes for locomotives; 9, for welded steel pipe; 10, for automobile carbon and alloy steels.

The committee also recommended certain revisions in its tentative standards: 11. For steel tie plates. 12. For low-carbon steel track bolts. 13. For steel plates for forge welding. 14. For carbon tool steel. 15. For electric cast steel anchor chain.

It also presented a new specification for commercial bar steels. This specification is not intended to take the place of any of the other standard specifications, but is prepared simply so as to provide a specification to which a purchaser may order who does not need any particular requirements.

The committee has been co-operating "with the track commission of the American Railway Engineering Association to the extent of presenting extensions and recommendations concerning the specifications of that association for tracks, spikes, screw spikes and tie plates." It has not been found possible to establish formal co-operative relation with the A. R. E. A. rail committee in regard to revising rail specifications, and accordingly committee A-1 will take up during the coming year the revision of the A. S. T. M. specification.

Steel Castings for Railroads

A most important development in the study of specifications for steel castings for railroads was the formation in January, 1920, of a joint committee on steel castings for railroads, consisting of representation of the A. S. T. M., the Mechanical Section of the American Railroad Association and the United States Railroad Administration.

Committee A-1 also recommended that action be deferred till next year on the removal of the war note permitting an extra point of phosphorus in acid steels and of sulphur in all steels. This refers to those specifications on which the note was permitted to stand last year; some of the other specifications had the note removed at the last meeting.

The committee reported that the joint committee on investigation of phosphorus and sulphur requirements had been organized as follows: United States Bureau of Standards, American Railroad Association, A. S. T. M., American Association of Steel Manufacturers, United States War Department, United States Navy Department, Society of Automotive Engineers, Society of Naval Architects and Marine Engineers, Steel Founders Society of America, Engineering Division, National Research Council.

A comprehensive series of tests is planned by the joint committee and it has been determined to study first the effect of sulphur, inasmuch as that presents the most urgent problem economically.

Rail Failures

An interesting paper was presented by J. E. Howard on "the shattered zones in certain steel rails, with notes on the interior origin of transverse fissures."

This paper is a continuation of the subject matter presented by Messrs. Warring and Hofamman at the last annual meeting of the society.

Committee D-7 on timber has recommended the following tentative specifications be advanced to standard: Southern yellow-pine timber to be creosoted, Southern yellow-pine piles and poles to be creosoted, wooden paving blocks for exposed pavements.

It also submitted a revised specification for structural Douglas fir.

Committee D-11 submitted a specification for adhesive insulating tape.

In Korea—The Land of Morning Calm

THE accompanying photograph shows one of the main entrances to the city of Seoul, Korea. The feature of this picture is the presence of modern trolley cars in the capital of this ancient country, installed there



Photo by International Film.

MODERN TROLLEY CAR IN THE CAPITAL OF ANCIENT KOREA

since the Japanese occupation of the kingdom. While there is a certain element of incongruity in this close juxtaposition of the old and the new, there is no question but that by giving the Koreans the benefit of modern transportation the Japanese are conferring upon them a real benefit.

Philadelphia Director of Transit Reports

W. S. Twining Says Continuation of Present Practices Means P. R. T. Bankruptcy—Complete Co-operation Between City and Company Necessary—Again Recommends Benefit Assessments to Finance City Rapid Transit Construction

THE Director of Rapid Transit of Philadelphia, William S. Twining, has just filed his report for the calendar year 1919. Coming, as it does, so closely on the heels of the report of Mayor Moore's commission,* though dated Jan. 1, 1920, it is of particular interest in the analysis of the electric railway problems of the Quaker City. Because this report forms the fourth and final under the administration of the retiring Mayor, Mr. Twining not only records the results attained during the year 1919, but also reviews some of the work accomplished during the four-year period and makes recommendations with regard to a final solution of the problem as he sees it.

The following abstract is of necessity brief, but gives some of the outstanding points of general interest:

Abstract of Report

During the year 1919 the department struggled to carry forward construction work upon the authorized high-speed system, but notwithstanding the use by the department of its best efforts to make real progress the year 1919 was a year of disappointments in transit development, as the transit department was again the victim of conditions beyond its control. At the very beginning of the year, Jan. 14, the Public Service Commission refused to approve the lease and contract which had been agreed upon between the city and the Philadelphia Rapid Transit Company in February of 1918. While it was acknowledged that that agreement was far from the ideal at which the city aimed when the decision was made to construct high-speed facilities, yet it was hoped that the commission would realize:

1. That no pronounced public sentiment for the municipal operation of the city's lines as a branch of the city's activities existed.
2. That the city's system was designed to function as a part of a unified system under the Philadelphia Rapid Transit Company's operation and management, and such use was understood by the public when the building of the system was decided upon.
3. That the Public Service Commission itself had previously approved of the construction by the city of a system of lines and the city at that time apprised the commission that the alternative of unified operation must be municipal operation with consequent competition with the Philadelphia Rapid Transit Company.
4. That if unified operation was to be secured the city and the company each had to consider and recognize the conditions existing and the limitations of the other, and the contract submitted was simply a compromise which was agreed "to be fair alike to the city and to the company."
5. That the matter of fare should, in fact, be secondary to service, and that six years had been consumed in reaching that agreement and the public would be injured more by a continuation of delay than by the acceptance of a contract which, while not ideal, would probably have provided good service, but at a cost somewhat higher than the ideal cost.

However, the refusal of the commission to approve the operating contract made the immediate redesigning of the city's system imperative, but the Legislature of 1919 adjourned without giving the city permission to hold a "referendum" on the system which the people authorized in 1916. A taxpayer's suit begun in August made it impossible to proceed with new contracts during the latter half of the year and work on older contracts has been much hampered by the insufficiency of funds.

The year 1919 closes with the outlook for progress during the coming year far from bright. The much-needed high-speed service for the entire city, which appeared so near at hand in 1916, now seems to be steadily receding and only by a realization that the effect of the same changes that have occurred since 1916 in all other lines of human activity must be faced in connection with transit matters also can any real progress be made toward securing the service which the city so sorely needs.

Expenditures made during 1919 total $2,665,958.84, and the total expenditures made by the department from the initiation of the transit investigation on May 27, 1912, to the end of 1919 are $11,600,518.23.

Status of City's Loans for Transit

The Legislature of 1919 adopted a revision to the city's charter intended to make illegal certain practices of the city in regard to paying current expenses by means of long-term loans. As the result of this legislation a taxpayer's suit was brought, resulting in a discussion by the Supreme Court that the unissued portion of transit and other authorized loans for capital use must be reenacted and readvertised in order to conform to the provisions of the new charter. The department has, therefore, been unable to start any new contracts since August.

In previous reports I have called attention to the dangerous situation liable to develop as the outgrowth of the plan of capitalizing the interest and sinking fund payments on transit loans. That my fears in regard to this have not been unfounded is shown by my letter to the comptroller (explaining the condition of affairs as of the end of this year), and I again urge that the financial features of the transit program be modified as soon as the necessary legislation can be secured, and that in the meantime Councils provide for these interest charges out of current funds until such time as it is fully demonstrated that the project will be at least partially self-supporting.

Service Rendered by the Philadelphia Rapid Transit Company During the Year

The service rendered by the company during the year has been far from adequate and appears to be growing far more inadequate with each passing month. The company, however, has endeavored to give the impression that the inadequacy of service has been due to the actions or rather inaction of the city.

Although the company's service was notoriously inadequate at the beginning of the year, yet the company did not increase its facilities to any appreciable extent. It is readily apparent that with the city's system in operation and carrying sufficient passengers to relieve the situation the company's income would be

*See extensive abstract, ELECTRIC RAILWAY JOURNAL, June 5, 1920, page 1160.

reduced to a point where its solvency would be seriously threatened. It is very evident, therefore, that the city's intention to construct a high-speed system to be operated by the company cannot be used as the basis for a claim that such intention warrants the company in furnishing inadequate service at the present time. The city's system, under the most favorable conditions, cannot be in full operation for several years and even when in full operation will not relieve the existing system enough to permit the existing number of cars to render adequate service. The company's claim, therefore, that the city's system is responsible for present conditions is wholly without foundation, and the claim is made for the purpose of directing attention away from the real cause of the inadequacy, namely, the company's inability to furnish adequate service and pay its present fixed charges out of the existing rates of fare.

This question of inadequacy of service is a matter connected with, but not dependent upon, the manner of operating the city's system. It is now coming to be regarded as the duty of the city to see that adequate transit service is provided the citizens, and the method by which that service shall be provided has been under discussion for several years and should be decided promptly and without unnecessary delay.

Increased Need of High-Speed Service

Although the need of high-speed service was recognized years ago, the great growth in all kinds of street traffic, particularly during the last four years, has made the necessity of a speedy construction of a high-speed system absolutely imperative. This is the most prominently outstanding fact in the transit situation today.

The next most prominent fact is that the system as designed in 1913 and as authorized in 1916 is absolutely impracticable to build under present conditions and would be practically unleasable even if built. Developments of the past year, beginning with the rejection by the Public Service Commission of the agreement heretofore reached between the city and the company, and the submission by the company of an absurd proposal in October, furnish most conclusive proof that the supply of unified service by the company based on a flat 5-cent fare and the use of the full city system as now authorized would be practically impossible. Many of the reasons for this conclusion are set forth in the reports made Nov. 14 and 21 to the street railways and finance committees of Councils upon the company's latest proposal, to which the company's proposals were submitted for consideration.

Co-operation

The previous reports of the department have pointed out that co-operation between the city and the Philadelphia Rapid Transit Company, which is the ideal desired by both the city and the company, will only become possible in case concessions can be made by both parties. In thus seeking each other's co-operation they are dealing as two public service corporations and each is seeking its own advantage, without a corresponding outlay—that is, each is trying to get more for its side than it gives or would have without such co-operation.

The condition held out to the public as an inducement for the city to construct the high-speed system was the ideal one, *i.e.*, that by so doing advantages could be secured without incurring corresponding obligations. The people were led to believe that if the high-speed system were constructed by the city out of city funds a unified system could be secured with universal free transfers, without adversely affecting either the tax rate or the carfare. Such a condition was not possible even at the time the promises were made and is absolutely impossible under present conditions. Although the company is adhering to the schedule of fares which has been in existence for many years, the service rendered by the company is so deplorably inadequate that additional facilities must certainly be supplied to meet not only present conditions, but to provide for the traffic anticipated for the immediate future. The company anticipates that the traffic within the next two years will require the transportation of upward of 3,000,000 passengers daily and to accomplish this with the surface car system now existing is not considered as physically possible. The point where facilities are most needed is in the business section, where the narrow streets and the great congestion make it impossible to operate any large number of cars in excess of those now operated. The company's earnings show a margin above the company's lease and other obligations far too small to warrant its assuming, under the present schedule of fares, the burden of the needed facilities. Therefore, the basis of co-operation between the city and the company must be entirely different from that which formed the basis of the proposed co-operation on which the city's system was authorized in 1916.

The testimony submitted to the Public Service Commission in justification of the rejected agreement between the city and the company showed that the present schedule of fares could not possibly meet the cost of service of the entire unified system as such cost was included in that agreement, and, as that contract was rejected by the commission as not being in the public interest, there seems to be no solution open except to start on a new basis which shall be radically different from the assumptions upon which the old one was based. It seems probable that the proper basis must be:

1. The valuation of the company's existing facilities used in the service of the public as the starting point for the capitalization to be supported.
2. A program of high-speed development suited to the city's financial abilities and the demands of the traffic.
3. A fare fixed by the Public Service Commission adequate to support unified service on the basis of 1 and 2.
4. A rental for the use of the city's system not contingent upon the company's dividend.
5. A liberal reward for good service to the end that management and labor shall thereafter work in the interest of the community and not to the exclusive interest of capital or the company.
6. A voice by the city in matters relating to service.

Assessment of Cost of Transit Facilities on Property Benefited

As pointed out in my first report of March 29, 1916, the development of a city is dependent upon its transit facilities, and high-speed facilities built under the function of city government for the purpose of developing the city should be paid for in part at least by assessment of all or part of the cost upon the property benefited. For many years it has been deemed just to assess upon abutting properties the cost of opening streets and building sewers, laying water pipe, etc. At that time (1916) the city solicitor held that such method of assessment was impracticable and that no

such act of the Legislature would be sustained as constitutional. As this matter is so vital to the city in connection with the development of adequate transit facilities for the city, I urge that the city take all the necessary steps to the end that the new State Constitution shall recognize the equity and justice of the principle underlying local assessment where local benefit can be clearly shown. The result of this method of paying for the cost of facilities would be to greatly lessen the interest charges and to keep the carfares low, which in these days of high prices is a matter affecting every citizen in the community.

Future Outlook for Unified Transit Service

If financial impracticability of the entire transportation enterprise in Philadelphia during the coming years is to be avoided several very disagreeable remedies must be applied to Philadelphia's existing transportation enterprise and certain very radical modifications must be made in the city's program for adding an additional transit system with its own serious problems to the existing defective financial structure.

The service provided by the present transportation lines of Philadelphia is neither adequate nor satisfactory. This is largely the result of the tendency of the management to fight off the inevitable effect of the present era of high operating and construction costs by refusing to increase service on existing lines and by the virtual cessation of constructing extensions. The company has not increased its service during the past five or six years to keep pace with the increase in traffic. It has been in this way that the company has succeeded since 1916 in showing net earnings sufficient to meet its heavy capital charges.

War conditions provided an excuse for the failure to build extensions and to keep up service, but the war is now over and the time is at hand when it is imperative that the company build the extensions that have been long promised. It is necessary also for the company to run more cars on many of its lines which during the rush periods of the day are overcrowded.

The company has been required to make large and frequent increases in wages during the past year and the time is undoubtedly near when, if the company is to provide the service which the public has a right to expect, it will find it most difficult to continue to meet its present capital charges with the present fares.

It will then be necessary to either raise the fares or reduce the capital charges. The patrons of the lines will strongly object to paying higher fares while the company is overcapitalized. The company will endeavor to procure an advance in fares without a valuation of the property or will urge that the value of the property substantiates the fixed charges which are now paid.

The company has not, during several years past, increased the number of cars operated proportionately to the increase in its revenue; the number of passengers carried per car-mile has reached the highest point during the history of the company. The company is therefore several years behind in its provisions of cars. Besides which, when the new rapid transit lines are placed in operation the large surface car requirements for transfer lines will probably cut deeply into the number of cars which it has been estimated might be disposed of during the early years of high-speed operation.

As there is little prospect of a return to pre-war operating costs, the provision by the company of adequate service will in all likelihood bring it face to face with a financial crisis such as so many other companies have faced during the last two or three years. It will then be the company's problem to substantially increase its revenues and will apply to the Public Service Commission for permission to increase fares.

The welfare of the citizens demands that the city be prepared to meet this move on the part of the company with a well-defined statement of its policy.

Conclusion and Recommendations

Before placing any contracts or beginning construction upon new rapid transit lines the new city administration should:

1. Adopt a definite policy as to the basis and extent upon which the city is willing to ally itself with the Philadelphia Rapid Transit Company in the joint supply of transit facilities and service in Philadelphia.
2. Arrange for such modification of the city's system as now authorized as will carry out that policy and along lines indicated in this report.

The completion of all outstanding subway contracts and the lack of any operating agreement between the city and the Philadelphia Rapid Transit Company leaves the matter of transit development in such shape that the city can readjust its program now more readily than at any other time since work was started in 1915, and the city should take advantage of this condition as a similar condition may not occur again.

On account of the importance of securing service on the Frankford Elevated Line as soon as possible, I recommend that the incoming administration arrange as soon as possible for the authorization and sale of a bond issue of say $4,000,000, such to be applied primarily to the purchase of cars and equipment for this line to Bridge Street, and any surplus remaining to be made applicable to any of the general uses of the department in connection with the development of the adopted plan. Inasmuch as the equipment contemplated to be purchased out of this money is of a more or less perishable nature and subject to more rapid deterioration than the subway and elevated structures heretofore contemplated, I recommend that these bonds be issued for a term not exceeding thirty years, and as the period of construction will be short, I recommend that the interest and sinking fund charges be not capitalized during the construction period.

On account of the urgency of the situation this matter should be taken up promptly by the new administration in order that no unnecessary delay may occur in putting this line in operation.

At the next session of the Legislature a determined effort should be made to secure passage of an act enabling the city to hold a referendum on any transit matter which may have been approved by public vote and which due to later knowledge or developments requires reconsideration in the public interest. The passage of such an act will do more than anything else to expedite the ultimate completion of the badly needed high-speed lines.

Experiments are being tried in the United States and in Italy with the burning of pulverized coal on steam locomotives, the increasing price and scarcity of high-grade coal having directed attention to the possibility of burning lignite and other low-grade fuels by means of the pulverized systems.

Interurban Freight Service*

A Classification of Operating Expense Accounts for Freight Service Is Suggested

BY W. K. ZINSMEISTER
Auditor and Treasurer Rochester & Syracuse Railroad

DURING the past few years a great deal of time has been spent in working out ways and means to increase passenger fares and to economize in operating expenses, but little attention has been paid by the interurban electric railway to inaugurate and to build up the electric freight business. The steam roads have just been turned back to their owners in such a deplorable condition that the time is ripe for the electric roads to get into this branch of the service, as municipal and other governing authorities are less apt, at this time, to place heavy restrictions on building of terminals and operation of freight cars in cities and villages.

Since I was asked to write a paper on the cost of operating the freight business, I have taken up this subject with the auditors of several of the larger interurban roads and was surprised to find that in nearly all cases no records are kept or reports compiled which would show whether the freight business is profitable.

I believe that if a study of the possible profits of the freight business, operated as an adjunct to the passenger, were made most of the interurban roads would find that there are great opportunities along this line.

This industry has been supplied by the Interstate Commerce Commission and by the Public Service Commission of this State with a uniform system of accounts for passenger service, but we have not as yet been supplied with any accounting system which will give us the cost of operation of freight service. I believe that this branch of the service should pay its proportion of expenses of maintenance of roadbed, track, overhead, etc., measured according to actual cost and use; also with all additional taxes and interest paid on account of operation of the freight service. Such a system must be simplified as much as possible, and I will, therefore, adhere to the uniform system of accounts as adopted by the New York State Public Service Commission. I will take up the operating expense accounts, which are distributed as follows:

WAY AND STRUCTURES

Maintenance of Track, Overhead, etc. (1-23)
This account shall include a proportion of the cost of maintenance, including supervision of roadway, track, bridges, signals, telephone lines, distribution system and all miscellaneous way and structures expenses as shown in the uniform system of accounts, numbered from 1 to 23 inclusive. This account shall be charged with the proportion that the freight car-miles bear to the total car-miles operated.

Buildings and Fixtures (24)
This account shall include the cost of labor and material used in repairing freight stations, platforms and all other freight structures; also a proportion of the cost of repairing jointly used carhouses, shops, offices and other buildings, same to be proportioned on use or car-mile basis.

Depreciation of Freight Buildings and Structures (25)
This account shall include the amount set aside to provide a reserve for the retirement of freight stations, platforms and other freight structures.

EQUIPMENT

Repairs to Freight Cars (31, 33)
This account shall include the cost of all labor and material used in repairing bodies, trucks and electrical equipment of freight cars.

Miscellaneous Shop Expenses (29, 36, 37, 39)
This account shall include a proportion of the cost of shop supervision, repairs to shop equipment, cost of heating shops and other miscellaneous shop expenses, same to be proportioned on use or car-mile basis.

Depreciation of Freight Equipment (40)
This account shall include the amount set aside to provide a reserve for the retirement of freight equipment.

POWER

Power Delivered to Cars (45-62)
This account shall include the total cost of power, including generating, converting or the amount paid for power purchased and all expenses incident to delivery of power to cars, same to be charged to this account at the cost of power per car-mile.

CONDUCTING TRANSPORTATION

Freight Trainmen (65)
This account shall include the wages for motormen, conductors and other trainmen engaged in freight service.

Station Employees and Expenses (68, 69)
This account shall include wages of agents, warehousemen and others employed in freight stations; also the cost of heating and lighting stations and other miscellaneous freight house expenses.

Freight Collection and Delivery (38, 76, 96)
This account shall include the wages of chauffeurs, drivers and helpers employed on wagons or other vehicles used for collection or delivery of freight. This account shall also include the cost of repairing wagons, harnesses, trucks and all garage and stable expenses incidental to maintenance of wagon or truck delivery service in connection with the freight business.

Loss and Damage (77)
This account shall include the expenses incurred for losses and damages to freight entrusted to the carrier for transportation; also cost of settling such claims.

Miscellaneous Transportation Expenses (63, 66, 67, 70-73, 78)
This account shall include a proportion of the cost of superintendence of transportation, car inspection, operation of signals and telephone lines and other miscellaneous car service and transportation expenses, same to be charged on the car-mile basis.

TRAFFIC

Solicitation of Freight (79)
This account shall include the salaries and expenses of freight solicitors and clerks.

Advertising (80)
This account shall include the salaries and expenses of advertising agents, the cost of printing and distributing timetables, folders, notices to shippers and all other freight advertising matter; also freight advertising in newspapers and magazines.

Miscellaneous Traffic Expenses (82)
This account shall include miscellaneous traffic expenses of the freight department.

GENERAL AND MISCELLANEOUS

Officers, Clerks and Miscellaneous General Expenses (83-91, 95)
This account shall include a proportion of the salaries and expenses of general officers and clerks, law expenses, stores expenses and miscellaneous general office supplies and expenses, the charge to be made on the car-mile basis.

Accidents and Damages (92)
This account shall be charged with salaries and expenses of claim agents and attorneys and amounts paid in settling claims of accidents arising from the operation of freight cars.

Insurance (93)
This account shall include premiums paid for insurance on freight buildings and equipment.

Stationery and Printing (94)
This account shall include the cost of printing freight bills, waybills, milk tickets and other freight printing; also the cost of stationery and postage used by the freight department.

Rent of Tracks and Facilities (97)
This account shall include the amounts paid for rent or use of tracks and facilities by the freight department.

*Abstract of paper read at the annual meeting of the New York Electric Railway Association, Bluff Point, N. Y., June 26, 1920.

Rent of Equipment (98)

This account shall include the payments to other companies for rent or use of freight cars and equipment.

TAXES

This account shall include gross earnings and income taxes based upon the gross and net earnings of the freight department; also state, county, town, city, village, school and other miscellaneous taxes actually paid on freight structures and equipment.

INTEREST

Technically the freight department should be charged with its proportion of interest, taxes, insurance and depreciation of roadway, tracks, overhead, buildings, etc., but inasmuch as the freight business is operated as an adjunct to the passenger service, it is practical only to charge this account with interest on equipment and facilities used exclusively for the freight business, at the same ratio that the general mortgage or indebtedness bears to the total value of all the railroad property covered by the mortgage. For example: If the total value of the railroad as covered by the mortgage amounts to $15.000,000 and the mortgage amounts to $5,000,000 at 5 per cent and the value of the equipment used exclusively for freight is $100,000, interest at 5 per cent per annum should be charged on one-third of $100,000 as, in this case, the railroad property is mortgaged for one-third of its book value. This account should also be charged with interest on any loans made for the purchase of freight buildings or equipment not covered by the mortgage.

FREIGHT DEPARTMENT REPORT OF EARNINGS, EXPENSES AND STATISTICS

SUMMARY OF OPERATIONS

Month of	Month of	This year to	Last year to
Earnings			
Freight (car load)			
Freight (less car load)			
Milk and cream			
Other revenue			
Gross Earnings			
Operating Expenses Accounts (Note)			
Way and structures:			
Maintenance of track, overhead, etc		1–23	(B)
Maintenance of buildings and structures		24	(C)
Depreciation of freight buildings		25	(A)
Equipment:			
Repairs to freight cars		31, 33	(A)
Miscellaneous shop expenses		29,36, 37, 39	(B)
Depreciation freight equipment		40	(A)
Power:			
Power delivered to cars		45–62	(B)
Conducting transportation:			
Freight trainmen		65	(A)
Station employees and expenses		68, 69	(A)
Freight collection and delivery		38, 76, 96	(A)
Loss and damage		77	(A)
Miscellaneous transportation expenses		63, 66, 67, 70-73, 78	(B)
Traffic:			
Solicitation of freight		79	(A)
Advertising		80	(A)
Misc. traffic expenses		82	(A)
General and miscellaneous:			
Officers, clerks and misc. general expenses		83–91, 95	(B)
Accidents and damages		92	(A)
Insurance		93	(A)
Stationery and printing		94	(A)
Rent of tracks and facilities		97	(A)
Rent of equipment		98	(A)
Total operating expenses			
Taxes			
Income less operating expenses and taxes			
Interest			
NET INCOME			
Freight Statistics			
Car-miles—owned tracks			
Car-miles—leased tracks			
Car-miles—total			
Car-hours—total			
Weight—foreign equip. carload			
Weight less car load			
Weight total			
Gross earnings per car-mile			
Operating expenses per car-mile			
Net earnings per car-mile			
Gross earnings per 100 lb.			
Operating expenses per 100 lb.			
Net earnings per 100 lb.			

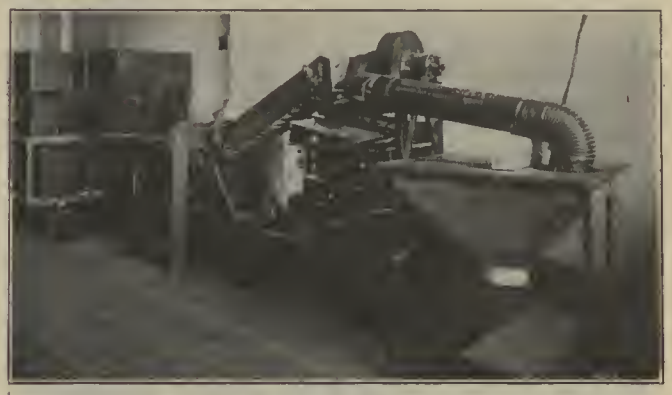
Note:
Proportioned
A = Actual, B = Car-mile basis, C = Part at A, part at B

The distribution of operating expenses, taxes and interest will not be exactly the same on all roads, but the fundamentals as set up in this system of accounts will give the cost of operation of the freight business, from which we can obtain valuable information. Most electric railroads have neglected this business and have failed to provide sufficient facilities for the business which they already have, and this information may be used to determine whether or not the business is profitable and whether or not it will pay to provide adequate equipment and facilities for the present business and further facilities for future growth.

Coin Counter at Kansas City

THE accompanying illustration shows the latest addition to the mechanical coin-counting equipment of the Kansas City (Mo.) Railways. This machine is a sorter and separator combined and is a development of several of the machines described in detail in the May 1 issue of the ELECTRIC RAILWAY JOURNAL.

The machine is a combination of a coin and ticket separator and a sorter of coins and tokens. The work which it does previously required two, and at times three, machines with operators. The new machine is operated by two people, one at the feed table and one at the tills. The contents of the fare boxes are emptied upon a revolving table, shown at the left of the picture. From this table they are fed onto a belt conveyor, and



NEW COIN AND TICKET SORTER USED BY KANSAS CITY RAILWAYS

the conveyor deposits its contents in the first jogging compartment. While the jogging process, which causes the coins and tokens to pass through a screen, is in progress the paper tickets are removed from the mass by means of a vacuum suction nozzle and are delivered through a tube to a hopper, from which they are checked and weighed. The coins and tokens pass through a series of screens, each with apertures for one denomination. From the tills the coins and tokens are delivered to the standard counting machines. The reversible table at the feed end of the machine provides for a continuous supply of material, for while one box is being counted the contents of another are arranged for the operator.

Two ½-hp. motors supply the power for the operation of the machine, one operating at 1,500 r.p.m. for driving the fan which produces the suction and the other operating at 1,700 r.p.m. for driving the conveyor belt and agitating the joggers. The machine has a capacity of 300,000 coins, tokens or tickets per hour. It is the work of a local mechanic in collaboration with L. M. Boschert, assistant treasurer of the railway company, under whose direction all tabulating of fare receipts is done.

What is said to be the largest jet condenser yet built was recently completed by the Westinghouse Electric & Manufacturing Company for the Alabama Power Company. It is capable of passing 13,000,000 lb. of water per hour.

Outing at Montreal

New England Street Railway Club Enjoys Trip—Prominent Government Officials Speak at Banquet

MONTREAL good fellowship and hospitality will long be remembered by the members of the New England Street Railway Club who participated in the trip to that Canadian city this week. The party, about eighty in number when it left Boston on the evening of June 28, was increased by delegates who joined at points along the route. Montreal was reached on Tuesday morning. Here another contingent, made up of some of those who had been in attendance at the Bluff Point convention of the New York Electric Railway Association, and others who had motored to Montreal, joined the party.

The first day was spent in an inspection tour of the city and system of the Montreal Tramways, personally conducted by officials of that company. The start was made about 11 o'clock from the Windsor Hotel, the delegates traveling in the official parlor car and the two open sightseeing cars of the company. A train of two



OFFICIALS OF THE MONTREAL TRAMWAYS AND OF THE CLUB IN FRONT OF THE POINTE AUX TREMBLES SUBSTATION

closed cars followed for use in case of rain, as the weather was threatening, but the services of this train were not required until during the last hour of the trip, when a short shower made this thoughtful provision of the hosts very acceptable.

After a tour around Mount Royal the party was taken to the new Pointe aux Trembles substation of the Montreal Tramways, where a bountiful lunch was served and the Montreal Tramways' band of thirty pieces played national and popular airs and cheers were given for Colonel Hutchinson, general manager; A. Gaboury, superintendent, and the other officials of the Montreal Tramways who had been so assiduous in looking after the comfort of the visitors. On the return trip the repair shops at Youville were visited.

While the members of the club were making this tour the visiting state officials who composed part of the party engaged in a game of golf at the Forest and Stream Club.

The banquet, held Tuesday evening in the Rose Room of the Windsor Hotel, was unique in that the guests included prominent state officials from each of the six New England states as well as leading Dominion and provincial officials. I. A. May, president of the club, presided and Hon. John N. Cole, Commissioner of Public Works, Massachusetts, acted as toastmaster.

The speaking was introduced by a toast to the King, offered by Mr. Cole, followed by another to the President of the United States, offered by E. A. Robert, president Montreal Tramways. Both toasts were drunk standing. The representatives of the New England states who later delivered addresses were Hon. Channing H. Cox, Lieutenant-Governor of the Commonwealth of Massachusetts; Hon. Clifford B. Wilson, Lieutenant-Governor of the State of Connecticut and also the Mayor of the city of Bridgeport; Hon. Leon F. Higgins, president of the Senate of the State of Maine; Hon. Emery J. Sans Souci, Lieutenant-Governor of the State of Rhode Island, and Hon. Mason S. Stone, Lieutenant-Governor of the State of Vermont. Speeches were also given by Hon. L. Athanase David, Secretary of the Province of Quebec; Alderman Dickson, who represented the Mayor of Montreal, and E. A. Robert, president, and Col. J. E. Hutchinson, manager of the Montreal Tramways.

Many references were made by the speakers from New England to the hospitality shown on the occasion of their visit, to the distinguished services rendered by Canada during the war, to the sterling qualities which had characterized the Canadians, mostly from the Province of Quebec, who had settled in New England in the past, and to the close ties of amity and economic interest which existed between these two neighboring countries of North America. With these sentiments the hope was voiced that these ties would become even stronger in the future. This expression of friendship was reciprocated by the speakers from Canada, who were most cordial in their greetings and in testifying to their pleasure in the selection of Montreal as the place for holding the annual outing of the club.

A feature of the dinner was the display of moving pictures of groups and incidents taken during the day's excursion.

On Wednesday afternoon the members of the club, accompanied by representatives of the Montreal Tramways, took a trip on the harbor of Montreal in a boat placed at their disposal by the Montreal Harbor Commission. The greatest interest was taken in the extensive system of docks, warehouses and terminal railways which have been constructed and are under construction by the Harbor Commission. After the return to the hotel Wednesday afternoon the delegates presented a piece of table silver to W. C. Bolt as a testimonial of their appreciation of his services as treasurer of the party. The club returned to Boston on Wednesday night.

New Features in Winding Machine

THE Comstock armature and field coil winding machine, embodying several new features, has recently been put on the market by the Diamond Manufacturing Company, Wyoming, Pa. The head of this machine, which carries the face plate, can be placed at any angle within 90 deg., thereby enabling the operator to wind a coil in any desired position. The machine is stopped and started by means of a pedal operating a cone clutch. It is driven through a worm gear and is equipped with a three-step cone pulley.

A hand wheel on the front of the machine is used to turn the face plate backward when desired. This wheel can also be removed and a form can be attached to the spindle for high-speed plain winding. The machine weighs approximately 350 lb.

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Standards Exhibit Planned for Convention

THE American Electric Railway Engineering Association has sent a letter to members of its committees announcing that in the campaign for extending the use of the association standards an opportunity will be afforded at the 1920 convention for manufacturers to display the association standards. Arrangements will be made whereby all standards in each manufacturer's exhibit can be designated with appropriate cards.

In addition to this the association itself plans to have a complete and representative exhibition of standards in its own booth. Only one sample of each standard, however, will be shown in this booth. The manufacturer members of each committee have been requested to furnish for exhibition in the association's booth such of the standards as they can readily provide.

Program Committee of Engineering Association Meets

A TENTATIVE program for the Atlantic City convention was discussed at a meeting of the Engineering Association's committee on engineering subject matter held at 8 West Fortieth Street, New York, Monday, June 28, at 10 a.m.

Those present were President E. R. Hill of Gibbs & Hill, consulting engineers, New York, N. Y.; A. B. Stitzer (chairman), chief engineer Republic Engineers, Inc.. New York, N. Y.; C. S. Kimball, engineer Washington Railway & Electric Company, Washington, D. C.; K. A. Simmon, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

The committee hopes to equal, if not improve, the program of last year, as it has plenty of vital and live subject matter for discussion and an extended list of inspiring speakers from which to make a selection.

Meeting of American Association Fare Systems Committee

THE fare systems committee met Tuesday, June 29, in the Association headquarters at 8 West Fortieth Street, New York. Those present were: W. H. Sawyer, (chairman), vice-president E. W. Clark Management Corporation, Columbus, Ohio; L. H. Palmer, assistant to president, United Railways & Electric Company, Baltimore, Md.; Thomas Conway, Jr., Wharton School of Finance, University of Pennsylvania, Philadelphia, Pa.; J. K. Punderford, vice-president the Connecticut Company, New Haven, Conn.; R. F. Carbutt, Henry L. Doherty Company, New York; L. R. Nash, Stone & Webster, Boston, Mass.; Robert W. Feustel, president Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.

Reports were read by several members relating to details of the committee program. This committee hopes to present a complete résumé of fare systems used during the past few years and deductions to be made from actual experience with these systems. The committee has a wealth of material and every member is working hard to produce something worth while for the consideration of the convention.

A Post-War Opportunity

THE association office has received a communication from Robert Kraudnoil, manager Salzburger (Austria) Railway & Tramway Company, containing a request that employees of electric railways in the United States assist their Austrian fellow-workers through the medium of food drafts. The substance of the letter follows:

Owing to the high cost of living and the poor rate of exchange many Americans have been helping Austrians. Usually, however, packages are sent only to persons by relatives or acquaintances in the United States. There are many who have no such relatives or friends. To secure relief for such, and to eliminate profiteering, I take the liberty, as director of the Salzburger Eisenbahn und Tramway Gesellschaft, to ask whether you would place at the disposal of our employees a sum covering three hundred and forty-seven families at $3 per package as per the accompanying list. The total cost therefore would be $1,041. If each American electric railway employee will do what he can according to his will and strength, this amount would not be a hardship on these employees while helping ours to get through a difficult period.

Please do not consider this request as an impertinence, but necessity drives us on to do what we can to obtain better conditions. Salzburg must be known to many a traveling American as the prettiest city of Europe.

In case this request meets with your approval we shall ask the American auxiliary at Salzburg to arrange for the reception and distribution of these packages.

Valuation Committee Meets

THE American Association committee on valuation met on Wednesday, June 30, at the association headquarters in New York City. The following members were in attendance: Martin Schreiber, chief engineer Public Service Railway, Newark, N. J., vice-chairman; Prof. H. C. Anderson, Ann Arbor, Mich.; Cecil F. Elmes, of Sanderson & Porter, Chicago, Ill.; J. H. Hanna, vice-president of Capital Traction Company, Washington, D. C.; W. J. Harvie, general manager Auburn & Syracuse Electric Railroad Company, Auburn, N. Y., and W. H. Sawyer, vice-president E. W. Clark Management Corporation, Columbus, Ohio.

This meeting was largely an organization meeting at which the scope of the report to be made at the annual convention was finally and definitely fixed and progress made in determining its character. The committee members all reported that the 1919 report had, so far as they could learn, proved a really substantial forward step in valuation discussions and there was no sentiment to modify this report in the least.

Waterbury Entertains Section 7

PROMINENT business men of Waterbury and musical and dramatic talent recruited from the local division of the Connecticut Company instructed and entertained the 122 members and guests of company section No. 7 on June 3. There were four addresses on civic and general topics, some readings and a minstrel show. The usual dinner preceded the meeting.

Brown, Boveri & Company are reported to have made, a few weeks ago, some tests on a 1,200-volt d.c. rack railway, equipped with regenerative control, to determine the percentage of energy recovered on down grades. The maximum grades are 17.9 per cent. The locomotives carry two shunt-wound motors. The recovered energy was 53.8 per cent of that required to take the locomotive up hill, based on measurements at the locomotive, or 59 per cent as compared with the substation power supplied.

Recent Happenings in Great Britain

Extension of Central London Railway Completed—Tramway Wage Question Revived—London Tramways Plan Expansion

From Our Regular Correspondent

After long delay, mainly caused by the war, the Ealing extension of the Central London Railway is expected to be open for traffic on July 1. The extension is about 4 miles long. It runs from the present western terminus of the Central London Railway at Shepherd's Bush to the suburb of Ealing, on the extreme western outskirts of London. The total length of route from Ealing to Liverpool Street in the city of London is about 11 miles, of which 6 miles are in deep-level tube tunnels. All the extension is surface railway on its own right-of-way. There will be ten-minute service of trains each way. This will probably be increased later to seven and one-half minutes, and the time for the journey will be thirty-eight minutes.

THE additional rolling stock (multiple-unit trains) was delivered before the war, and as the railway was not ready for it it was utilized for the through service between the Baker Street & Waterloo Railway and Watford on the London & North Western Railway. New rolling stock for the service is now being delivered, so that the Central London Company's cars are freed for the Ealing service. There will now be three routes between Ealing and the city of London, namely, the Central London Railway, the Metropolitan District Railway, and the combined Great Western & Metropolitan Railways route. It is hoped that considerable relief will be given to the congestion during the rush hours on the District Railway. A peculiar feature is that the three stations in Ealing are alongside of one another, two being terminals and one a wayside station on the main line of the Great Western Railway.

On May 28 the tramway wage trouble broke out again. It will be recalled that the National Joint Industrial Council for the industry, after making an award of 6s. increase per week, which was not accepted in some districts, left each district council to try to settle matters locally according to existing conditions. Five district councils came to agreements, but the other four failed to do so. The National Council met on May 28 to try to settle the disputes, but was not successful. Meanwhile more trouble was threatening because the London omnibus men were, like the tramway men, pressing for an advance of 10s. a week. The Minister of Labor took up the matter and discussed it with the parties, and the final result, which was announced on June 4, was a settlement. The tramway men in the London area receive a flat rate increase of 9s. a week, the graded increase proposal being abandoned. For provincial districts the principle of the Lancashire settlement, namely a graded increase of 7s., 8s. and 9s., has been adopted. The London omnibus workers were thereafter granted an advance of 9s. The original demand was for a flat rate increase of 10s. a week for the whole country.

The National Wages Board on June 4 issued its award on the applications by railway (as distinguished from tramway) men for large increases of wages. The increases granted are much more modest. They range from 7s. per week downward. The increases will necessitate further raising of fares and freight rates.

Lord Ashfield, chairman of the underground railway group, and one of the greatest authorities on London traffic problems, has an interesting article in the May number of the *Nineteenth Century and After*. He regards present difficulties as mainly due to a lack of foresight which allowed London to grow to its present size without proper plan or co-ordination. High speed he regards as the basis on which a healthy metropolitan city can be reared. The present underground railways will have to be supplemented by additional high-speed railways with fewer stations. What is wanted, he concludes, is:

1. A general plan for the development of the whole metropolitan area.
2. A scheme of facilities for rapid communication carried into effect ahead of development.
3. A transfer of all transport agencies to private enterprise, subject to public control, with a pooling scheme for co-ordination.
4. A unification of control in the hands of a statutory authority.

A. F. Buxton, chairman of the finance committee of London County Council, estimates a deficit on the working of the Council's tramways for the current year of £462,000. The reserve fund has already been exhausted. The expenditure on salaries and wages now amounts to 12.36d. per car-mile against 4.5d. in 1914. A special committee is now inquiring into the general conditions under which the tramways are being operated with the object of putting them on a self-supporting basis. Meantime help from the local rates is contemplated.

The London County Council does not intend to allow present financial troubles to prevent it from going forward in the path of tramway progress. There is a strong determination among most of the councillors that the tramways must be put in a strong position and to see that no charge shall come on the rates in respect of them. The traffic is growing on the existing lines and some others are to be opened. During 1919-20 there was an increase of 7.7 per cent in the number of passengers as compared with the previous year. Further increases will come with the development of housing schemes in the suburbs. A. L. C. Fell, the general manager, estimates that for the growth of traffic on existing routes 124 additional cars are required, while for new lines to be opened eighty more will be necessary. Out of the total, seventy-nine will be available from existing stock when material on order is delivered. The remaining 125 are to be ordered as soon as tenders can be obtained from builders, but in the present condition of industry delivery is not speedily expected. The type of car will be the same as that now in use, namely, a double-deck roof covered, eight-wheel bogie car seating seventy-eight passengers. The Council, however, is not satisfied that the last word in design has been reached, because it is offering a prize of £1,000 for the best design which can be put forward. Officers and other employees of the Council are not to be eligible to compete, but otherwise the competition will be open to the world.

Another town which is trying a new type of car is Sunderland. The main feature is the provision of doors at the front to be used for exit, so that less time may be spent in loading and unloading.

The tramways (temporary increase of charges) bill received the Royal assent on May 20. It is accordingly now an act of Parliament and law of the land. This, it may be recalled, is the measure which enables the Minister of Transport to issue orders enabling tramway undertakings to raise the fares above the present statutory maximum. This in most cases is a penny per mile. In the case of municipal tramways the increases are to be such as will enable the undertaking to be carried on without loss, while in the case of company-owned tramways the increases are to be sufficient to provide for interest on loan capital and a reasonable return on share capital. At the end of May a first step was taken under the act, the Ministry of Transport authorizing an increase of the minimum fare on the London United Tramway Company's system from 1d. to 1½d. The increases granted for the long-journey fares are relatively small.

The annual conference of the Tramways & Light Railways Association will be held in London on July 2.

The introduction of the token system for ¾d. fares, in lieu of the abolished ½d. fares, for short journeys on the Glasgow tramways has caused a great deal of work to the officials. The tokens, which in substance resemble celluloid, are purchasable at twelve for 9d. The passenger hands the conductor a token and gets a ticket in return. The tokens are obtainable from employers, shopkeepers, etc., as well as from the tramway offices. The whole arrangement is of some magnitude, as hitherto more than 6,000,000 passengers per week have been carried for stages not longer than those to which the ¾d. fares apply.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Sixty Cents in Rochester

Award Announced in New York State Railways Arbitration Proceeding —Nine-Hour Day

Sixty cents an hour as the rate of compensation and a basic nine-hour day are prescribed for motormen and conductors employed by the New York State Railways on its Rochester, Syracuse and Utica lines, in the award announced on June 28 by the Board of Arbitration before which the wage-and-hour dispute was argued between the company and its employees. The new wage scale represents an increase of 33⅓ per cent over the present scale of 45 cents an hour. The award is retroactive to May 1.

Men's Representative Dissents

The award brings to a close the controversy which resulted in the three-day strike in Rochester, Syracuse and Utica early in May when the railway refused to grant demands for a 100 per cent increase in wages and an eight-hour day.

James H. Vahey, who represented the men on the board, dissented from the opinion of the majority, as constituted by former Supreme Court Judge Arthur E. Sutherland, neutral and presiding member of the board, and B. E. Tilton, vice-president of the railway. Mr. Vahey declared for a higher wage scale than 60 cents an hour and an eight-hour day.

The board expresses the opinion that it is not possible to give the men a living wage on the basis of an eight-hour day and at the same time give the public adequate service at a 7-cent fare. The majority of the board also declares that in consideration of the increases the men already have received, 60 cents an hour is a fair wage.

Details of Wage Scales

Revisions in the working agreement between the railway and the Rochester, Syracuse and Utica divisions of the Amalgamated, as arranged by the arbitrators, indicate the following scale for motormen and conductors: City lines, for first three months, 56 cents an hour; next nine months, 58 cents; after a year, 60 cents; interburban lines, 62 cents an hour. Employees on the third-rail Oneida line are to receive 65½ cents an hour. Men on express and baggage runs are to receive an additional 5 cents an hour. Miscellaneous shop employees, except those otherwise provided for, are to receive an increase of 33⅓ per cent upon their rate of wages and classification as of May 1. Emergency truck men are to be paid $175 a month.

Mr. Vahey declared that he was "hopelessly at variance with the views of Mr. Sutherland and Mr. Tilton." He says that he offered the arbitrators to join in an eight-hour award for the men at 62½ cents an hour. According to him, this would mean a daily wage of 40 cents less than that actually awarded, but the men would have accepted the sacrifice in order to get the shorter day.

Confiscation Cannot Be Justified Because of Past Fault

The Consolidated Gas Company, New York, N. Y., and six of its subsidiaries were granted a temporary injunction in the Federal District Court on June 29, effective July 1, on their application to restrain the State, County and Public Service Commission officials from enforcing the 80-cent gas law. The preliminary injunction permits the company to charge at the rate of $1 per 1,000 cu.ft. until the final settlement of the case by the higher courts. The Kings County Lighting Company also obtained an injunction with permission to charge a $1 rate.

Three separate opinions were handed down, one covering the case of the Consolidated Gas Company, one the Kings County Lighting Company, and one the six Consolidated subsidiaries taken together. With some slight modifications the three opinions were practically identical. The court held:

> The objections made would not deprive the companies of their rights to be protected against the present confiscation of their property.
>
> It would be impossible for the companies now to furnish the candle power they failed to furnish in the past and it will be well nigh impossible for the Mutual to divide with its then consumers its excess profits over 10 per cent that they were entitled to; besides the maxims relied on do not apply that he who comes into equity must come with clean hands and he who asks for equity must do equity.
>
> A plaintiff denied relief in equity it left to his remedy at law, but there is no such remedy as will enable these companies to collect their losses which they may sustain pending final hearing of the requirements if the act is held unconstitutional. Confiscation cannot be justified because of past fault. The affidavits satisfy us that the 80-cent gas rate is confiscatory and that a rate of $1 per 1000 cu.ft. will be well within moderate return on the capital investments of the companies. The preliminary injunction prayed for is granted on condition that the companies deposit the amount collected above the statutory rate with a special master who shall deposit it and distribute same in accordance with the decree in a final hearing.

The plaintiffs alleged that the 80-cent gas rate was confiscatory. The defendants objected that the companies had not furnished candle power as required by law and in the case of the New York Mutual Gas Light Company, one of the subsidiaries of the Consolidated Company, it had not divided its excess profits over 10 per cent with its consumers as required by its charter.

Arbitration Decision Awaited

Davenport Awaiting Report on Request for $1 an Hour—Fare Injunction Continued

A board of arbitration is now attempting to settle the wage scale for the trainmen of the Tri-City Railway, Davenport, Ia. The board has been in session for more than three weeks without reaching a verdict. No immediate finding is expected, according to members of the board.

66 Per Cent Increase Asked

Arbitration was provided for in the contract signed between the company and the trainmen a few weeks ago. The wage scale decided on will be retroactive to June 1. The men are asking $1 an hour maximum. The present scale provides for 60 cents an hour maximum.

A 7-cent fare is now charged on both the Iowa and Illinois lines of the company. In Iowa this fare is collected under an injunction secured by leading retail merchants to prevent the socialist city administration from insisting on collection of the 5-cent fare as provided in the old franchise.

The city administration has filed an answer to the injunction, but no final hearing will be held by the court for several months.

In the meantime the city is having an audit made of the traction company's books and on this audit a valuation will be fixed for the steam, gas and electric railway properties.

The city's bill for this audit will be approximately $25,000, Aldermen state. The appraisal work will be done by Burns & McDonnell, Kansas City, with whom the city has entered into a contract.

City Questions Valuation

The city refused to accept the company's valuation figures and is going to considerable expense to procure valuations on which the socialists hope to found their argument for a 5-cent railway fare and a continuance of the present gas and electric rates before the courts. The Peoples Light Company, affiliated with the railway company, recently petitioned for an increase in the gas and electric rates. All these petitions for an increase will be held in abeyance until the audit is completed and valuations made.

A continuance of the 7-cent fare on the Illinois lines will be asked of the Public Utility Commission of Illinois. The petition will be submitted by J. G. Huntoon, general manager of the Tri-City Railway.

Many Angles to Detroit Affairs

Formal Statement Regarding Fares—Court Denies Company's Plea to Have Ouster Suit Dismissed

A formal statement has been issued by Judge Jayne of the Circuit Court of the agreement reached before him between the city and the Detroit United Railway regarding a temporary rate of fare. Both parties to the agreement, the city and the company, reserve all rights they have, and the agreement further sets forth that the company will at once permit an audit of its books and that a hearing will be held to determine the right of the court to determine the reasonableness of a universal rate of fare for the city. This can be revoked by either the city or the company at any time. It is agreed by representatives of the city and the company that the determination of the right of the Circuit Court to pass on the reasonableness of the rate of fare will give the contending parties a permanent forum for the adjustment of differences regarding fare.

THE arrangement whereby the city will build one track of a double-track line on Harper Avenue and allow the railway to construct the other is taken as evidence of an altered attitude of the municipal administration. It has met with favorable comment, especially among some of those who will be served by that extension.

The Detroit *Free Press*, while maintaining that the Detroit United Railway's total project stopped by the police would be more satisfactory, states that a half loaf is better than no loaf at all and perhaps the second half will be forthcoming later. The city, it is cited, should be as a whole encouraged as well as pleased, because it is justified in cherishing a hope that the arrangement regarding Harper Avenue is no mere sporadic concession to public interest, but that taken in connection with the recent fare adjustment it indicates the beginning of a definite reversal of policy in the city hall.

City Plans Bond Sale

The sale of the first $300,000 of public utility bonds, part of the $15,000,000 issue, has been authorized by the Council. The bonds have been purchased by the city itself and are being sold by the treasurer. Although passed upon and approved by the bond expert to whom the issue was referred, the legality of the entire issue is being contested by the Detroit United Railway.

The company's motion to have the city's ouster suit dismissed was denied Monday by Judge Dingeman in the Wayne County Circuit Court. The ouster suit was instituted by the city in 1918, and, following Judge Dingeman's decision, the court will now proceed to try the city's suit to order the company off all streets on which its franchises have expired.

The Council passed a resolution in 1918 directing the Corporation Counsel to proceed to have the Detroit United Railway removed from the streets. This action was later confirmed by a resolution which went more into detail. Then with the passage of the Kronk ordinance fixing the fare at 5 cents on all franchise and non-franchise lines, the Detroit United Railway attacked the validity of the ordinance in the United States District Court. The Detroit United Railway appealed to the United States Supreme Court when its application for an injunction was denied by Judge Tuttle, and the Supreme Court ordered the District Court to hear the application for temporary injunction and to determine the case on its merits. The case was not pushed until last month, when the company asked that the suit be dismissed, arguing that the Council should have directed the suit by ordinance instead of by resolution.

That the State Constitution and the new City Charter gave the Council a general right to control the persons or corporations using the streets, and that this would include the right to control the use of the streets, was held in the judge's decision. Under the provisions quoted, the local authorities are held to have power to control within the use of their streets for any purpose whatsoever not inconsistent with the state law. The court held that the substance of the ouster resolution was administrative and therefore did not need to be by ordinance, since the resolution passed by the Council is considered to be merely a recital of the passed expiration of franchise rights.

There is serious doubt as to the validity of the Kronk ordinance. The intent of the Council in the ouster resolution was that steps be taken to terminate the company's rights in the streets where the franchises have expired and pending such action that proposed legal and reasonable restrictions be imposed, the decision recites. These restrictions the Council sought to impose through the Kronk ordinance.

It was further held that the Council had the right to assume that a year or more probably would elapse before such ouster proceedings, if begun immediately, could be heard and finally terminated in the courts, and it extended to the railway, whose rights in the streets had expired, the privilege of remaining there and operating its railway system, pending such determination of the contemplated proceedings, on the terms prescribed by the ordinance. There is nothing inconsistent in the position taken by the Council in this respect.

Toledo Ordinances Passed Again

Council Seeks to Insure Their Legality—Plans Being Made for Political Campaign

The members of the commission which formulated Toledo's twin municipal ownership ordinances for acquiring and constructing a transportation system for the city have resolved themselves into a committee to provide the nucleus for a summer campaign. They have planned to educate the people in favor of the public ownership plan before the primaries on Aug. 10. The Council passed the twin ordinances a second time last week to assure the legality of the special election. There is a conflict in state and city charter regulations providing for the referendum and the City Council was taking no chances. The last vote was fourteen to two in favor of submission.

THE campaign to be waged in behalf of the ordinances is to bring to the city Mayor Couzens of Detroit and many other exponents of the public ownership of street railways and to conduct open air meetings with local speakers in all parts of the city. The publicity of the campaign is being supported by only one of the three local newspapers. One afternoon paper, the *News-Bee*, a member of the Scripps-McRae league, is fighting for municipal ownership.

In offering an explanation as to the necessity for the two ordinances the commission gave out the following statement indicating its general plan:

> This commission did not wish to recommend the acquisition of a bus system to the entire exclusion of electric lines. Nor did it favor the purchase, bodily, of the present street railway system, to the exclusion of bus lines. The members wished the city to be in a position where it could establish the most modern kind of a transportation system possible. Such parts of the present system as are of modern design and necessary for a permanent transportation operation should be purchased from the company. Where present tracks must be rebuilt or new lines laid, the city would have the power to construct them. And where bus lines would be more economical or flexible the city should have the means to provide them.

For this reason the commission has designated $3,000,000 for acquiring buses and modern parts of the present street railway system and another $4,000,000 for replacing old tracks and constructing new lines.

The cost-of-service plan as finally agreed upon in all points except valuation was deposited with Judge John M. Killits of the Federal District Court by members of the commission which formulated it. This action was taken so that it might be revived at any time either the city or the company wished to open negotiations.

So far in the campaign the company has paid no attention to the efforts of those in charge of the municipal ownership campaign.

A noteworthy fact is the failure of the Doherty management to pay the interest and principal on the bonds of the Maumee Valley Railways & Light

Company, and also the interest on $1,500,000 first mortgage bonds of the Toledo & Western Railroad due on July 1. This would indicate that the company is relinquishing its hold on some of the poor-paying lines taken over at the same time the Toledo Railways & Light Company property was acquired.

Ten-Cent Fare Matter Pending

These two lines were assumed as a part of the inheritance of the old parts of the present Toledo system. The Maumee Valley lines could be made a part of the city system to take care of future up-river growth. The Toledo & Western is a distinct interurban operating into Adrian, Mich., and some smaller villages in the northwestern part of Ohio.

No definite action has been taken by the Rail-Light attorneys relative to bringing up for hearing the cross-bill providing for a 10-cent fare with 2-cent transfers which was filed early in the spring by the Doherty interests.

Temporary Injunction Granted

Denver Tramway Restrained from Reducing Wages or Otherwise Impairing Its Service

District Judge Whitford on June 26 granted the application of the city of Denver, Col., for a temporary injunction against the Denver Tramway. The court overruled the demurrer of the company and denied its motion to dismiss the proceedings on the grounds that the court has no jurisdiction. The order is very broad and sweeping. It restrains the company from reducing the higher wage scale established by a local board of arbitration on March 18, 1920, and from taking any other action which might interfere with continued railway service.

City Not Required to Give Bond

In the absence of any pleadings or arguments by the employees, Judge Whitford declined to make a ruling with regard to them although the city of Denver in its application of May 29 requested an injunction against the local branch of the Amalgamated Association prohibiting them from striking for any reason. The restraining order was entered on May 29. It was made against both the company and the association.

The direct application by the company that the city be requested to furnish adequate bond to cover the losses of the company of some $1,200 a day resulting from the injunction was denied.

The City Council on May 10, 1920, referred to popular vote during May, 1921, the 7-cent fare ordinance initiated by the company as an immediate means of relief in order to furnish the additional revenues required to meet the higher wage scales established by the arbitration board.

Short Strike in Toronto

Men Accept Compromise Offer After Being Out Four Days—Sixty-Cent Maximum Provided

Employees of the Toronto (Ont.) Railway, failing to receive the increase to 66 cents an hour demanded by them, went out on strike on June 23. After two or three conferences between representatives of the company, the men and the Ontario Railway & Municipal Board, the board made a proposition increasing the wages to 55, 57½ and 60 cents an hour, according to classification, and announced that if the men would accept these wages the board would enforce the agreement upon the railway.

Men Accept Proposal

A mass meeting of the employees was held at midnight on June 26, when the proposal was accepted. Service was resumed on the morning of June 27.

The strike lasted four days, during which period a large number of jitneys operated under license from the city corporation, at a charge of 5 cents per mile.

On May 9 the employees at a mass meeting prepared draft of demands on the company with respect to hours, wages, etc. On May 26 a committee representing the men conferred with the officers of the company. On May 28 the bill which had been introduced into the Ontario Legislature permitting electric railway fares to be raised under certain circumstances was defeated by the Assembly. The Toronto Railway then, on May 30, applied for a board of conciliation and named William H. Moore, general manager of the Toronto & York Radial Railway.

On June 1 the employees selected John T. Vick, a prominent labor man of Toronto, as their representative. These two parties having failed to agree upon the third member, the Honorable Minister of Labor appointed Justice F. S. Maclennan, Montreal, who was also to act as chairman.

The conciliation board sat on June 9 and 10 and heard evidence submitted by both parties. On June 13 it brought in a unanimous report rejecting the employees' demands. These demands were an increase from the present maximum of 55 cents an hour to 85 cents and for an eight-hour day, as well as some minor changes in the present arrangement.

Men Went Out on Short Notice

The public announcement of the award created a very strong feeling of dissatisfaction among the men and on the next day Mr. Vick, the employees' representative on the Board of Conciliation, submitted a minority report declaring that he had signed the unanimous and joint report under a misapprehension. In his minority report he recommended that the present working conditions be continued until Aug. 31, 1921, which is the date of expiration of present franchise. He also recommended that the men should receive the same rates of pay as the employees of the Toronto Civic Railway, namely, 60 cents an hour for first three months, 63 cents an hour for next nine months and 66 cents an hour thereafter.

The employees' union called a special meeting on June 15, and it was decided that unless the Toronto Railway made the rate of pay equal to that paid by the city of Toronto to employees of the Municipal lines, a strike would be called on June 17.

The Toronto Railway directors were called together, but it was impossible to obtain a quorum. When this was announced on Thursday afternoon, the officials of the union called another mass meeting for midnight on Thursday. The men then decided to postpone the time for striking until June 23.

Twin City Men Less Insistent

Employees of the Twin City Rapid Transit Company have fallen in with the ideas advanced by a committee of citizens to give Minneapolis and St. Paul more time in which to define their positions with respect to the company. In consequence, the strike by the men which it had been said would take place on July 1 has been put off on the promise to arbitrate the differences. The understanding is that if increased fares are granted, the wage increase shall be retroactive to July 1. The one disturbing element appears to be the fact that the Twin City Company may not be able to pay the retroactive wage if the increase in fare is delayed.

Mayor J. E. Meyers of Minneapolis insisted that separate figures be presented for the two cities at the joint Council hearing in Minneapolis upon the request by President Horace Lowry for a 7-cent fare in each city and four tickets for a quarter. No action has been taken by the Aldermanic Council of either city.

In Minneapolis a 7-cent fare and a 6¾-cent ticket, according to the company, would produce $1,966,743 in 1920 for the improvement of service, an increase of wages and a return to investors. If the service of the company were put on the 1917 basis and the men paid 20 cents an hour more, without the overtime feature and the eight-hour day, a total of $1,955,000 would be required. In St. Paul on the same basis there would be a net deficit of $900,339.

The estimated net income for 1920 at a 5-cent fare is $870,743 in Minneapolis. On the same basis the deficit in St. Paul is estimated at $119,339.

On the present basis of operation with a 5-cent fare Minneapolis produced in the first four months of 1920 $870,743. In St. Paul the deficit for the same period is at $119,330. On Sept. 1, 1919, a wage increase was granted of 5 cents an hour. Thus the net income in Minneapolis for the last four months of 1919 was reduced to $294,448, while in St. Paul there was a deficit of $40,869. In neither case is the full effect of this shown because service had to be reduced.

New Rochester Proposal

Service-at-Cost Measure with Graduated Return to Railway Submitted on June 30

The service-at-cost contract which was negotiated by the New York State Railways and Corporation Counsel Charles L. Pierce, representing the city of Rochester, N. Y., was presented to the Common Council at a special meeting of that body on the evening of June 30. The contract was immediately referred to the law committee, and it was announced that a public hearing will be held on July 6 before definite action is taken. Assurance is given, however, that the new contract will be accepted or rejected by the Common Council before July 15, when the grant is scheduled to go into effect.

A 15,000-Word Contract

The service-at-cost plan as presented to the Council is embodied in a 15,000 word contract, divided into nineteen articles. The plan was accepted by the board of directors of the New York State Railways at a meeting held on June 29 in New York. The object of the contract, as specified in article 2, is "so to arrange their affairs that the company shall provide in the city of Rochester the very best service which it is possible to give under any system of careful, scientific and economical management and to secure to the company a proper return upon the value of the property used in service."

The contract if adopted by the Council will take effect on July 15 and is to continue in force until July 15, 1930. Within five days after its execution the Mayor of Rochester is instructed to designate a person to be known as "Commissioner of Railways," with a salary of $12,000 paid by the railway, whose duty shall be to administer the contract for and on behalf of the city. Three appraisers are to be appointed to determine the fair value of the property of the company.

Eight rates of fare are provided for, and rate E will be put in force at the beginning of operations. The rates are as follows:

Rate A—3 cents, or six tickets for 15 cents.
Rate B—4 cents, or seven tickets for 25 cents.
Rate C—5 cents, or ten tickets for 45 cents.
Rate D—6 cents, or nine tickets for 50 cents.
Rate E—7 cents, or ten tickets for 65 cents.
Rate F—8 cents, or ten tickets for 75 cents.
Rate G—9 cents, or twelve tickets for $1.
Rate H—10 cents, or eleven tickets for $1.

Stabilizing Fund Provided

When the balancing fund provided for exceeds the sum of $300,000 by the sum of $200,000 on the first of any month, on the first day of the following month the fare will automatically change to the next lower rate, and will in the same manner by the same method continue to change to the next lower rate so long as the balancing fund shall, on being computed and determined on the first of each month, be found to equal or exceed the sum of $500,000. Likewise when the balancing fund on the first of any month is found to amount to less than $200,000 the fare on the first of the following month will automatically advance to the next higher rate.

The company is to receive as its sole income and compensation an annual return on the base value according to schedule. When the fare is 3 cents, for instance, the return will be at the rate of 8 per cent per annum; when 4 cents 7.5 per cent per annum; when 7 cents (as it will go into effect) at 6 per cent per annum; when 10 cents, 6 per cent per annum.

Dayton Men Reject Arbitration Offer

On June 28 the railways at Dayton, Ohio, made a proposition to arbitrate the wage question, which caused a strike of the employees some days previously. They stated that wages of platform men only would be submitted to arbitration. When the suggestion was presented to the men, they refused to consider it on the ground that several of the strikers were employed in other capacities. Furthermore, they asserted that any arbitration proceedings must include wages, hours of labor and general working conditions.

New Orleans Negotiations Progressing

There will be no strike of the trainmen of the New Orleans Railway & Light Company, New Orleans, La., if the efforts of Rufus Foster, Judge of the United States District Court, Receiver J. D. O'Keefe and J. B. Lawson, executive committeeman of the men's union, can prevent it.

Mayor Martin Behrman has been called into the conference with the view of learning whether the Commission Council would favorably receive a proposition to advance the car fare to 7 cents, a request which had previously been denied the receiver. While he was noncommittal in his answer the Mayor asked for time to learn the attitude of the business interests toward the increase in fare. He also wants to hear from the labor organizations. The Mayor suggested that whatever solution of the present difficulty was arrived at by the conferees, any new wage award should be made retroactive to July 1, when the old contract expired. There is a disposition to meet some of the demands of the men, but a feeling prevails that a less arbitrary attitude by the men themselves would be helpful to their cause.

A resolution has been adopted by the local Stock Exchange asking that investors in the securities of the company receive equal consideration with the company's employees in the settlement of wage differences. It was reported on June 28 that the men are asking for 53 cents an hour and an eight-hour day. This would mean an average wage of about $150 a month.

Jitneys Are Curbed

New London Decides That Buses Have Been Permitted to Run Unrestrained Too Long

With the jitney issue squarely before them the people of New London, Conn., have gone on record for reasonable regulation of the buses. First the local Council acted in the matter. Later, on appeal, the voters themselves backed up the restrictions which the Council sought to impose.

Ideal Jitney Territory

New London is a mighty active little business place at all times. In the summer, however, it becomes the center of a very considerable shore colony with a greatly augmented population and a goodly number of excursionists. Heretofore the jitneys have run wild, particularly on Montauk Avenue, which extends from the center of the city to Ocean Beach. On this street the Shore Line Electric Railway operates. There are two parallel streets from the city to the beach that are free from trolley tracks.

After considerable deliberation the Council on June 7 passed an ordinance regulating motor traffic. Among other things, this measure ruled public autos designed to carry more than seven passengers off Golden, Green, Pearl and Tillery Streets, also Montauk Avenue from Bank Street to Lower Boulevard, to Pequot Avenue, in either direction, and in a southerly direction on Bank Street between State Street and Truman Street. Moreover, the measure provided that the operator of any such vehicle seeking to do business should file with the captain of police a statement showing among other data the route over which he intended to operate, a description of his vehicle and the fare to be charged. He was also required to carry such information upon the vehicles in the form of a placard. Failure to comply with any of the terms of the ordinance was made a misdemeanor punishable by a fine of from $5 to $30. Public notice is required to be given of any intended change in fare.

Jitney Men Defeated

The jitney men were quick to assert themselves. The city charter provides that within fifteen days of the passage of an ordinance the Mayor shall, if requested in writing by five members of the Court of Common Council and thirty other voters of the city, call a special meeting of the voters to pass upon the matter. The question of regulation was thus brought before the city on June 29. The jitney men retained counsel and solicited the electors personally. On the other hand the electric railway trainmen also appealed to the electors among their friends. When the vote was taken an overwhelming majority was cast for the regulatory measure. In consequence the ordinance will be continued in effect.

Shore Resort Employees Strike

The trainmen in the employ of the Atlantic Coast Electric Railway, Asbury Park, N. J., have returned to their jobs following a conference between officials of the company and a committee of the union. The company is to be allowed to continue its "open shop" policy in view of the peculiar circumstances existing at Asbury Park during the summer months. The men will receive 50 cents an hour for a ten-hour day, with a bonus of 5 cents an hour applicable during the summer. Overtime will be paid at the rate of time and a half. The men had asked for 65 cents an hour for a nine-hour day. The discharged men will not be reinstated.

The employees went on strike June 13 following the refusal of the company to reinstate six men who were discharged. Scott F. Hazelrigg, president of the company, declared that the men discharged were not dismissed because of their affiliation with the unions, but were laid off for "violation of company rules." Two of the discharged men do not belong to the union.

The men quit on the eve of the time set for an answer from the company to the demands for an increase of 25 cents an hour in pay and a nine-hour day. The company's answer to the demands was to have been an offer of 50 cents an hour with a 5-cent-an-hour bonus for faithful services throughout the summer. A ten-hour day was proposed. The company has an application before the Public Utility Commission for an increase in the rate of fare to 8 cents.

$639,464 Asked for War on Chicago Utility Rates

The finance committee of the City Council of Chicago, Ill., was appealed to during the week ended June 26 by Chester E. Cleveland, Mayor Thompson's chief traction lawyer, for an additional appropriation of $639,464 to carry out the fight against higher traction fares and telephone rates. The Council has already appropriated $323,858 for the traction and telephone litigation this year. Should this new request be granted, the total sum to be spent this year will be $963,322. This is in addition to the sum of $250,000 which the Council made available to the Mayor to evolve his "people's ownership plan." With this sum included the grand total involved amounts to more than $1,213,000.

The city having been rebuffed repeatedly in its attempt to reverse the decisions of the Illinois Public Utilities Commission, Mr. Cleveland's request states that appeals to the State Supreme Court and perhaps to the United States Supreme Court will probably be necessary in the surface railway, elevated and telephone cases.

Of the above new request for funds, $449,600 is asked for specifically for contesting the increase in elevated fares, which have not been attacked up to the present time. The city has never had any control over the elevated lines, since these are chartered under the state railroad law.

So the Foreign Born May Know

An information service for the benefit of employers of foreign born labor and for the workers themselves has been established by the Inter-Racial Council at the Woolworth Building, New York. The object of the service is to check the tendency of the foreign born to return to their native lands under the mistaken impression that prices are lower and living conditions better there than in America. This is done by circulating reports from the foreign language newspapers regarding actual conditions abroad and by reports from unbiased authorities, such as the Red Cross. There is no charge for this service. The information is designed for the use of editors of internal house organs, shop papers, etc., and may be adopted for use as shop bulletins, posters and pay envelope stuffers and similar publicity. The service is in line with the constant effort of the Inter-Racial Council for the welfare of the foreign born by promoting better relations between the various races in America and the native born.

Temporary Settlement Planned at Akron

City officials at Akron, Ohio, have had under consideration plans for allowing the Northern Ohio Traction & Light Company to establish a higher rate of fare temporarily, pending a final disposition of the proposed new franchise, in order that employees may be paid wages recently awarded by a board of arbitration. These officials are unwilling to grant a permanent franchise, containing an increase in the rate of fare, until an examination is made of the company's books and other investigations are completed.

The men voted on the question of an immediate walk-out on June 23 and 24 and it was lost by a very narrow margin. This insured continued operation of the cars until July 4, at least, and hope was expressed that by that date some step would be taken to make possible the payment of the new wage.

William Lemmon, of the Amalgamated Association, it is said, won a victory in the defeat of the strike movement. He stated that he was opposed to precipitate action as unfair to the public and for this reason he advised the defeat of any proposition that would result in a suspension without due notice.

Traction officials stated that they would pay the men the increased wage if it was possible, to secure the funds. The men will receive the new wage from May 1, they said, as soon as the company receives additional revenue. The present rate is approximately 48 cents an hour for a ten-hour day, while the wage granted by the arbitrators is 65 cents an hour. The difference will be paid them as soon as it is made possible, according to the statements.

Jitneys Become Intolerable

Bridgeport, Conn., is to be called upon to choose between the electric railway and the jitney. Notification to this effect is said to have been given to Mayor Clifford B. Wilson. The notification states that unless something is done the trolleys may be withdrawn from service. According to one source of information the formal notice of the Connecticut Company's proposed withdrawal from Bridgeport was set to be presented on July 2. The date of the withdrawal was given as July 15. Morgan B. Brainard, Hartford, a trustee of the company, is reported to have said that the notice of discontinuance of service would be reasonable. Mr. Brainard is credited with the statement that after the Bridgeport matter has been settled the company will proceed to consider jitney competition in New Haven and Hartford. He is quoted as follows:

> Of course, we will not spring any sudden ultimatum upon Bridgeport and say, "tomorrow we will take away the trolleys," but will give ample warning so that there may be time for deliberation and well-considered choice. The trustees are agreed that the case of Salem, Mass., where the community was given the choice between the trolleys and the jitneys, is the only way effectively to deal with the competition between the two forms of transportation.
>
> If the community prefers jitney service, well and good. We have no feeling against such action, but will be governed accordingly and remove a form of transportation that is second choice. For three or four years jitney competition has caused the Connecticut Company serious loss and the trustees feel that it is only sane business to settle the issue with the communities involved.

Richard T. Higgins, chairman of the Public Service Commission, when questioned in regard to the suspension of service, said:

> Offhand, I would say that the factor of equity would greatly assist the company if it were able to show that its entire operation in Bridgeport was done at a loss. In cases of this kind the technical legalities of the franchise requiring utilities to give continued service on all lines does not weigh against the factor of equity when the latter is clear and outstanding. No public utilities commission would care to stand out for a full enforcement of the requirements of the franchise if that would mean permanent and serious loss to the utility from causes not under the utility's control.

Franchise Allowances Increased

According to information published at Youngstown, Ohio, the board of arbitration which has been considering the application of the Youngstown Municipal Railway for an increase in allowances under the service-at-cost agreement has fixed the operating allowance at 34 cents per car mile and has added 1 cent per car mile to the maintenance allowance, making it 9 cents. This increase, it is said, will not make it necessary to increase the rate of fare, which is now 9 cents cash and six tickets for 50 cents.

The Board of Arbitration is said to have ordered more than $23,000, which had been put into a suspense fund, transferred to the stabilizing fund.

It was expected that the formal report of the board of arbitration would be completed and ready on June 28 for presentation to the Railway Commissioner, the company and the press.

People's Ownership Bill

Chicago Measure Provides Taxpayer Must Stand Deficit Under Mayor's Five-Cent Plan

The bill to be submitted to the State Legislature, which is designed to bring about ownership and operation of the electric railways of Chicago by the people, was made public by the Mayor's traction commission during the week ended June 26. The plan of the bill is to enable the voters to create a transportation district and elect five trustees to take over and operate the lines. One of the most interesting sections of the proposed bill is No. 10, which provides that the taxpayer will have to come to the rescue and pay the deficit if the Mayor is in error in his assertion that 5-cent fares would provide enough money to pay operating and maintenance charges.

This arrangement would virtually amount to a service-at-cost plan, except that the taxpayers, instead of only the car riders, would have to share in providing the necessary revenue. When the Mayor's request for $250,000 to work out his "people's ownership" idea was before the Council traction committee, Attorney Walter L. Fisher, who drafted the 1907 ordinances in Chicago, attempted to insert the words "service at cost" in the ordinance providing for the inquiry, but the Mayor and his friends stopped the move. It was pointed out at that time that "5-cent fares" is a better campaign slogan than "service at cost."

The bill authorizes any 5,000 voters of the proposed transportation district to start the ball rolling toward public ownership by filing a petition with the county judge. It is made his duty to form a commission to be composed of himself and two Circuit Court judges to decide on the boundaries of the district after public hearings. The question would then go on the ballot, and, if approved, trustees would be elected at the following general election.

The operation of the entire scheme is of course contingent on the passage of the bill by the State Legislature.

Ten-Cent Increase Awarded

There is to be an increase of 10 cents an hour in the wage scale of the motormen and conductors of the Portland (Me.) Railroad, included in the system of the Cumberland County Power & Light Company. This means an increase of about $180,000 in the company's payroll for the coming year. The increase means a wage scale of 50, 52½ and 55 cents an hour.

This account was written before formal announcement had been made of the award. When asked if these figures were not correct, Judge Joseph E. F. Connolly, who represented the railway on the arbitration board, said he might be quoted as not denying the figures. The figures decided upon by the arbitrators are approximately 10 cents less than the rates of 60, 62½ and 65 cents an hour demanded by the men. The scale just mentioned would have meant a total increase in the company's payroll of upward of $400,000. The decision of the board, composed of W. R. Pattangall, Judge Connolly and James E. Vahey, cuts this sum more than half.

The hour wage scale did not come into force with the local railroad employees until 1916, when the wages amounted to 26, 27, 28 and 29 cents an hour, according to service. In May, 1917, there was an increase of 3 cents an hour in the scale, and the following year, 1917, there was an increase of 4 cents. In November of the same year the War Labor Board gave the employees of the Cumberland County Power & Light Company an award amounting to an 8-cent increase. The two advances in salaries that year amounted to 12 cents an hour. The day's work is reckoned on a ten-hour basis.

Legislation Urged to Reduce Electrolysis

Among the resolutions adopted by the Natural Gas Conservation Congress held at Washington recently is the following which relates to electrolytic damage to gas piping systems:

> That the attention of the state authorities be called to the necessity, from a public interest, of establishing or enacting legislation and enforcing regulations to reduce and limit, and whenever possible prevent, the carrying of stray electric currents on underground gas transmission systems, because where such stray electric currents —that have leaked off of the grounded return of single-trolley electric railways— shunt around joints on the gas pipes or leave the gas pipes to go back into the soil, they must always remove a part of the metal, and thereby produce what is known as "electrolysis," which is a disintegration of the pipe that will ultimately produce a hole, and thereby increase the leakage, as well as a life and property hazard.

News Notes

Champaign Men Get More.—The Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill., has granted a 5-cent increase in pay to its trainmen, retroactive to May 1 and extending to May 1, 1921.

Maine Men Awarded Advance.—Employees of the Androscoggin & Kennebec Railway, Lewiston, Me., are granted an increase in wages by the award of a board of arbitrators made public on June 14. The new scale is 53 cents an hour, with 58 cents an hour for operators of one-man cars. The finding is retroactive to May 1.

Strikebreakers Go on Strike.—For the second time within a week service on the lines of the Fresno (Cal.) Traction Company was paralyzed on June 5 by a strike of strikebreakers themselves. About thirty-five men who had been imported to replace the regular employees walked out. As a result the company was able to muster only sufficient crews to man about ten cars. This comprises about one-half of the rolling stock utilized for service during normal times.

Protests Holding Referendum.—The Houston (Tex.) Electric Company, which is seeking a new franchise in Houston granting increased fares on a service-at-cost basis, has filed a petition with the City Council not to hold the referendum election on the new franchise. The election has been practically decided on, but not definitely ordered. The company claims that with the City Council divided on the proposition, the public may turn down the franchise. The negotiations leading up to the present proposal extended over many months.

Must Vacate Streets.—An ordinance has been passed by the City Council of Martins Ferry, Ohio, providing for the ousting of the Wheeling (W. Va.) Traction Company from the streets of that city, this action being taken as a result of the raising of the fare to and from Bellaire from 5 to 10 cents. Under the terms of the ordinance the company must remove all tracks, poles, wires and equipment from the city limits twenty days after the ordinance becomes effective.

Ashtabula Endeavors to Purchase Railway.—If the Ashtabula (Ohio) Rapid Transit Company will agree to take the entire amount of $350,000 of bonds authorized by the city in exchange for its property, the trade will soon be made. Recently the company agreed to accept $296,000 in bonds for the line, but no buyers have been found for the other $54,000 of the issue, which was the portion intended for extensions and new equipment. The city now asks the company to take the bonds for this purpose. Recent ordinances have put the jitneys out of business and the electric railway will have all the business, if taken over by the city.

Decision for Railway in Forfeiture Case.—The Supreme Court of Tennessee has decided the case of the City of Nashville vs. the Nashville Traction Company and Equitable Surety Company, in which the city was seeking to enforce the payment of $200,000 on a bond executed by the traction company, to which a franchise was granted in 1913, the condition of the bond being to protect the city from liability in damages for accidents incident to the construction and operation of the railway and so secure the expenditure of $500,000 in the construction of the system within two years. The construction of the system was abandoned after little work was done and the franchise was forfeited. The court held that the city was not entitled to any recovery on the bond because no special damages were averred or proved by the city, the bond being construed as one given for a penalty and not for liquidated damages, so that proof of special damages was necessary to any recovery thereon.

Financial and Corporate

Bankers Adopt Platform

Indeterminate Permits for Utilities and State Regulation by Appointed Officials Indorsed

The committee of the Investment Bankers' Association of America on public service securities, of which O. B. Willcox, Bonbright & Company, New York, is chairman, is sending out to 6,000 mayors, public utility commissioners and other public officials throughout the country a letter accompanied by a resolution passed by the board of governors of the association. The association has apparently sensed the need for placing itself on record in a definite way on the three important utility questions which have to do with the type of franchise, character of regulation and selection of public utility commissioners. The letter sent out by the bankers was as follows:

The enclosed copy of resolution passed at a meeting of the board of governors of the Investment Bankers' Association of America on May 8, 1920, reflects the opinion of representative investment bankers of the country with respect to three important subjects affecting the credit of public utilities and their ability to render adequate public service: the limited term franchise as compared with indeterminate permits; state regulation as compared with local regulation, and appointive commissioners as compared with elective commissioners.

SERVICE DEMAND CONTINUES

The operators of utilities throughout the country report that the demand for public utility service exceeds the available capacity and that there is great demand for the expansion of all classes of public service which contribute notably toward increased production and decreased production costs, so vital to our national welfare.

Expansion of public utility service requires capital which must be drawn from the free investment funds of the country by the sales of securities. The investment bankers of the country are security merchandisers; they cannot provide the large amounts of money required except through the sale to investors of securities in competition with other security offerings.

The re-establishment of the credit of public utility companies is therefore of prime importance and your attention is earnestly invited to the recommendation of the board of governors of the Investment Bankers' Association of America.

The resolution adopted by the association of bankers was as follows:

Whereas investment bankers are expected to purchase and distribute the securities of public utility companies which must be sold if utilities are adequately to supply the demands upon them for local transportation, light, heat, power and the transmission of messages; and

Whereas the credit of many of the public utility companies will not permit the sale and distribution of such securities, thus interfering with the development of many commercial enterprises, the welfare of many communities and the comfort and convenience of a great many people; and

Whereas the credit of the public utilities is largely dependent upon the attitude of the public as expressed through the various governing and regulatory bodies; it is hereby

Resolved, By the board of governors of the Investment Bankers' Association of America, that as steps in the restoration of the credit of the public utilities:

1. Term franchises should be superseded by indeterminate permits securing the right to operate under proper regulation during good behavior with provisions for equitable adjustment of rates from time to time, as tending to eliminate controversies which inevitably impair the public service, the credit of the companies involved and the value of their securities.
2. The power of regulation and control of public utilities should be vested in state commissions as tending toward standardization of regulation which is not possible under local regulation.
3. Members of state commissions should be appointed.

If commissioners are elected they are frequently embarrassed by political policies and platforms in the consideration of questions which should be decided only on sound economic and financial principles.

Interborough Met Interest Payments

Announcement was made on June 25 that the Interborough Rapid Transit Company, New York, N. Y., would pay interest, due July 1, on $160,585,000 first and refunding 5s, averting receivership on that date. Fixed charges and other obligations due on July 1 totaled $6,222,900, in addition to $1,100,000 taxes due at that time. To meet this liability of $7,322,900 the company had on deposit on May 15 $4,624,230. Net operating income and miscellaneous receipts brought this to approximately $7,424,230 by end of June.

Thus the company had enough cash to pay current accounts and fixed charges, but not sufficient funds to meet in full the $2,900,000 notes due June 30, although about half of this sum was realized from the sale of real estate pledged as part of collateral for the notes. This obligation was due to banking interests friendly to the company and no difficulty was experienced securing an extension.

In ten months to April 30, 1920, the daily average of passengers carried on the Interborough system, including subway and elevated lines, increased more than 400,000 over the same period of preceding fiscal year. The aggregate of passengers carried during the ten months was 789,167,629, an increase of 125,720,762. This increase in traffic reduced the operating deficit for the ten months to $1,979,817, compared with a deficit of $3,457,832 in ten months to April 30, 1919.

The Interborough's greatest burden at present is the elevated system. During the ten months ended April 30 the company received from subway operations net income amounting to $2,165,005, but during the same period the deficit on the elevated lines was $4,144,822, leaving a net deficit of $1,979,816.

North Shore Bonds Offered

An offering of $1,500,000 of Chicago, North Shore & Milwaukee Railroad ten-year 7 per cent secured sinking fund gold notes, Series A, is being made by Halsey, Stuart & Company, New York, at 92 and interest yielding 8.20 per cent.

Brooklyn $1,040,362 Behind

Comparative Figures for Both Surface and Rapid Transit Lines Made Public by Receiver

Carl M. Owen, counsel for Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, has prepared figures on the financial condition of the company which show that the system as a whole has gone from a surplus of $1,483,816 in 1918 to a deficit of $1,040,362 in 1919. On April 30 of the current year the deficit had grown to $1,891,995.

SURFACE LINES GO BEHIND

The company passed into the control of Mr. Garrison on Dec. 31, 1918, and on July 14, 1919, the surface lines of the company followed a similar course. Three tables are incorporated in the report showing the items comprised in the bookkeeping system of the company and covering gross and net operating and non-operating income, taxes and fixed charges. These tables disclose for the rapid transit lines a surplus of $425,385 for the calendar year 1918, a deficit of $775,508 for 1919 and a deficit for the ten months ended April 30, 1920, of $1,159,489.

For the same periods the surface lines show deficits of $646,141, $2,030,863 and $2,029,288 and for the B. R. T. System a surplus of $1,483,816 for 1918, a deficit of $1,040,362, for 1919, and a deficit of $1,891,995 for the ten months period.

THE FIGURES IN DETAIL

The following figures for the two full years, 1918 and 1919, show the variation in the items:

	1918	1919
SURFACE LINES		
Gross oper. revenue	$15,860,182	$17,110,363
Operating expenses	11,509,661	14,540,030
Net oper. revenue	$4,350,521	$2,570,333
Taxes	1,044,991	1,031,354
Operating income	$3,305,530	$1,538,970
Non-oper. income	476,562	474,291
Gross income	$3,782,092	$2,013,270
Fixed charges	4,428,233	4,044,133
	*$646,141	*$2,030,863
RAPID TRANSIT LINES		
Gross oper. revenue	$14,359,819	$17,066,342
Operating expenses	9,200,110	12,787,479
Net oper. revenue	$5,159,709	$4,278,863
Taxes	844,833	916,813
Operating income	$4,314,876	$3,362,050
Non-oper. income	288,990	363,035
Gross income	$4,603,866	$3,725,085
Fixed charges	4,178,481	4,500,593
	†$425,385	*$775,508
B. R. T. SYSTEM		
Gross oper. revenue	$30,982,034	$35,065,704
Operating expenses	20,035,790	26,513,833
Net oper. revenue	$10,946,244	$8,551,871
Taxes	2,613,750	2,200,633
Operating income	$8,332,494	$6,351,238
Non-oper. income	414,566	751,396
Gross income	$8,747,060	$7,102,634
Fixed charges	7,263,244	8,142,996
	†$1,483,816	*$1,040,362

*Deficit. †Surplus.

Mr. Owen explained that it was difficult to present the comparison be-

tween the present time and pre-receivership periods, because of unadjusted claims, "and particularly those arising from the deplorable Malbone Street accident of November, 1918." He added, however, that sufficient comparable data are obtainable to indicate the trend of results now accruing and these have been assembled.

Mr. Owen also explained that in October, 1919, the Brooklyn City Railroad lease to the Brooklyn Rapid Transit Company was terminated, which explains some marked changes in the figures of the surface lines.

Mr. Owen said further:

> The figures presented do not reflect the currently excessive cost of maintenance met through charges to reserves prior to July, 1919, so far as the surface lines are concerned, or the excess outgo over charges as to rapid transit lines which the contract with the city requires shall be met from funds set aside on a tentative basis at the beginning of a year and revised at the end of the year. This item, it is estimated for the current fiscal year, will probably exceed $600,000, indicating a deficit on rapid transit lines of over $1,800,000.
>
> During the week ended November 21, 1918, the total payroll of the B. R. T. system amounted to $322,768, which was at the rate of $16,783,936, and for the week ended April 15, 1920, the payroll was $477,283, or at the rate of $24,818,716 a year, an increase of $8,034,780 annually, which is equivalent to an investment at 5 per cent. of $160,000,000 absorbed by labor.
>
> On the basis of the accounting called for under the city contract at the time of the receivership, Dec. 31, 1918, the amount of unearned preferential to which the company is entitled before the city gets any return on its investment was $2,328,589. On April 30, 1920, those figures reached the total of $5,664,194. The city's unearned charges on Dec. 31, 1918, were $8,820,087 and on April 30, 1920, $13,534,286.

Net Earnings of Chicago "L" Decline

The steadily declining financial condition of the Chicago Elevated Railways shown in the accompanying statement for April, 1920, points to the imperative need for an increase in revenue and explains the company's recent application for a 10-cent fare. Although the rate of fare in April, 1920, was higher than in April, 1918, the increase in gross revenue has not kept pace with the increase in operating expenses. In other words, a margin of $88,326 above operating expenses in April, 1918, has turned to a deficit of $45,817 for April, 1920. On the net earnings for April, 1920, the roads lost nearly 0.7 cent per passenger carried without any allowance for return to the stockholders. Beginning June 1, the operating expenses will take another jump owing to the new 82-cent maximum wage scale.

Gross earnings	$1,311,554
Total expenses	1,149,857
Balance for interest	$161,696
Fixed interest charges	207,513
Net deficit for April	$45,817
Payroll for April, 1920	$685,572
Per cent of operating expenses paid to labor	59.62
Total passengers carried in April, 1920	16,150,898
Average rate of fare per passenger	7.73 cents
Cost of carrying each passenger	8.40 cents
Loss per passenger carried	0.67 cents

Twelve Large Companies Compared

More Traffic Being Handled, but Operating Ratio Continues to Climb Steadily

Comparative statistics were presented in the ELECTRIC RAILWAY JOURNAL of March 29 of twelve of the largest electric railways—six being suburban lines and the others being companies which operate rapid transit lines, some of the latter in combination with surface lines. Operating figures from the same properties have again been collected for the last fiscal year and some interesting contrasts are shown. They reflect the increased rate of fare, growth of traffic and heavier operating costs. When studied in connection with data from the United States census report for 1917, abstracted in various issues of this paper, and with other figures published in the issue of June 12, the latest returns present a comprehensive picture of the changing railway situation.

FOR OBVIOUS reasons, the twelve properties included in this study cannot be identified. It may be stated, however, that each of them does an annual business of more than $6,000,000 and their average yearly receipts are more than $20,000,000. To show how large a part of the electric railway industry they represent, it may be stated that they operated one-seventh of the railway mileage of the United States and hauled about one-half of the total passenger traffic last year.

FARE DATA

As evidence of the changing fare situation it is interesting to note that of the companies under consideration five of them, in 1918, charged 5 cents, two 6 cents, one 8 cents, two had zone systems, one a 2-cent transfer plus a 5-cent fare, and one a 3-cent transfer charge, whereas during the past year, four had 5-cent fares, three had transfer charges ranging from 1 to 3 cents, one a 6-cent fare, one a 7-cent fare, two 8 cents, and one 10 cents.

GROSS INCREASING RAPIDLY

In the item of gross earnings, these six large surface companies showed an increase of 18.6 per cent over the previous year, while operating expenses including taxes increased 25.9 per cent. The six rapid transit companies showed a gain of 15.5 per cent in gross revenue and 27.9 per cent in operating costs. The operating ratio for the surface group averaged 83.06 per cent, ranging from 73.71 to 96.23, while the other companies averaged 74 per cent and ranged from 60.73 to 83.88 per cent. It should be explained in this connection that three out of the six rapid transit companies include a large percentage of surface mileage. To show the difference where only elevated or subway company figures are treated, the operating ratio for three such companies was 71.04 in 1919 as against 60.74 in 1918.

Having been retarded in the development of their properties during the war period it was not to be expected that the railways would be able to meet a sudden growth in traffic demand with an adequate increase in service. Therefore, while the revenue passengers on the surface lines increased 7.1 per cent the car mileage increased only 1.5 per cent. On the rapid transit lines the increases were 6.4 and 4.4 per cent respectively. There was practically the same proportionate increase in car hours. This meant that there was little change in the average speed on the properties studied. The benefits which were expected from skip-stop practice failed to materialize because these experiments were not permitted to continue long.

USE OF ROLLING STOCK DECREASED

There was a decrease in the use of rolling stock as indicated in the item "annual miles operated per car." The average for surface companies was 35,406 and for rapid transit lines 39,231, as against 35,299 and 42,045, respectively, in the previous year.

Due to the fact that some of the companies considered do not keep account of transfer and free passengers, a true statement of "total passengers per mile of single track operated" cannot be given. However, taking the figures as they are presented—that is allowing for omissions principally on the rapid transit lines—there was an increase of 3.3 per cent for surface companies and a decrease of 5.8 per cent on rapid transit lines. The number in the former group ranged from 781,509 to 2,187,623, while for the latter they were from 1,105,778 to 2,901,571.

One of the best analyses of results on these large properties is shown in the accompanying table.

One factor which renders unfair a comparison of figures between these twelve properties is that the data from five of the companies are for the fiscal year ended June 30, 1919. With wages and other operating costs increasing constantly the properties whose figures covered the full calendar year naturally showed at a disadvantage in many items. On the other hand they had the advantage of larger revenues where fares were increased late in the year.

STATISTICS PER CAR MILE AND PER CAR HOUR ON TWELVE LARGE ROADS

	Six Surface Roads	Six Rapid Transit
Transportation revenue per car mile (average)	38.9 cents	33.1 cents
Expenses and taxes per car mile (average)	32.5 cents	25.9 cents
Transportation revenue per car hour (average)	$3.26	$4.21
Expenses and taxes per car hour (average)	2.75	3.25

New York City Gross Increase

The July-September, 1919, quarterly summary of revenues and expenses of the surface and rapid transit electric railways operating in New York City has recently been issued by the Public Service Commission. The reports showed that passenger revenue had increased 14.78 per cent over the 1918 quarter, but that the net corporate income had decreased to such an extent that there was a deficit of $3,691,071, as against $633,888 in the 1918 quarter. This is due entirely to the fact that the operating ratio increased 12.25 per cent. Higher wages and cost of materials, together with 7,000,000 additional car-miles made necessary to handle an 11.6 per cent increase in traffic, caused the higher operating costs.

EARNINGS OF NEW YORK CITY COMPANIES

Quarter July-Sept.	1919	1918	Percentage +Inc.	Percentage —Dec.
Passenger revenue	$28,070,136	$24,433,002	+14.78	
Other transportation revenue	173,916	176,126		—1.25
Total revenue from transportation	$28,244,052	$24,609,128	+14.77	
Other railway operating revenue	1,811,666	1,402,310	+29.15	
Total railway operating revenue	$30,055,718	$26,011,438	+15.52	
Operating expenses:				
Maintenance expended	$5,902,476	$4,402,511	34.0	
Depreciation reserve	629,231	Cr. 272,238	331.9	
Operation of power plant	3,809,425	3,210,332	18.7	
Operation of cars	10,497,023	7,455,450	40.8	
Inquiries and damages	817,373	849,067		—3.7
Traffic and general expenses	1,170,731	900,100	30.0	
Total operating expenses	$22,826,259	$16,545,222	38.0	
Net operating income	$7,229,459	$9,466,216		—23.6
Street railway taxes	1,896,531	2,269,310		16.5
Operating income	$5,332,928	$7,196,906	25.9	
Non-operating income	1,105,016	1,006,124	9.8	
Gross income	$6,437,944	$8,203,030		—21.6
Deductions:				
Interest	$5,459,702	$4,272,271	27.8	
Rents	4,154,835	4,195,654		—1.0
Miscellaneous	514,478	366,903	40.4	
Total deductions from gross income	$10,129,015	$8,834,828	14.7	
Net corporate income	*$3,691,071	*631,798		—485.0

* Deficit.

TRAFFIC AND MISCELLANEOUS STATISTICS OF NEW YORK CITY COMPANIES

Quarter July-Sept.	1919	1918	Percentage +Inc.	Percentage —Dec.
Miles of track, exclusive of storage and yard tracks	1,801.14	.....	.....	
Average daily maximum number of cars operated (Sept.)	8,311	.....	.....	
Passenger car miles (active)	86,032,020	.....	.....	
Car seat miles	4,481,770,668	.....	.....	
Total revenue car miles	87,614,867	80,597,918	+8.75	
Passenger car hours	7,376,766	.....	.....	
Ratio CM-CH (speed M.P.H.)	11.65	.....	.....	
Revenue passengers	557,320,585	494,753,741	12.7	
Revenue transfer passengers	17,741,499	.....	.....	
Total revenue passengers	575,062,084	494,753,741	16.3	
Free transfer passengers	63,448,080	77,456,688		—18.1
Total passengers	638,510,164	572,210,429	11.6	
Operating ratio	75.95	63.70	12.25	
Car mile statistics:				
Operating revenue (cents)	34.30	32.30	6.2	
Operating expenses (cents)	26.05	20.50	27.1	
Net income (cents)	*4.21	*0.784		—436.0
Passenger traffic (total)	7.42	7.11	4.4	
Average seats per car mile	57.20	.....	.....	
Car miles per revenue passengers	0.1542	0.1629		5.3
Seat miles per total passengers	0.702	.....	.....	

* Deficit.

Dallas $516,214 Behind Permitted Return

Troubles of the Dallas (Tex.) Railway are being told to the public by the company in newspaper space. In the thirty-one months ended April 30, 1920, the company failed to earn the 7 per cent return on the money invested in the property by $516,214. This means that for the period mentioned the company is facing a deficit to this amount in its permitted return.

During 1917 the settlement of the railway situation was submitted to the voters for a full discussion and at an election on April 3 of that year a franchise was granted to the Dallas Railway. The total property value determined in the manner provided by the franchise was $8,857,045 at the close of business on April 30, 1920. This represents the amount of money invested in the property as agreed with the city. The authorized return of this is 7 per cent per annum, or for April, 1920, was $51,271. The gross income from all sources for April was $246,341. The operating expenses for the same month were $209,925. The balance earned was $36,415. As the authorized return as previously stated was $51,271, the shortage in the permitted return was $14,856. This represents the difference between the amount of money the city franchise says the company is permitted to earn and the actual amount of money that was earned.

The statement was published with the sanction of the board of directors of the company.

Option on Augusta Lines

$262,000 Needed to Secure Property with Present Value of About $10,000,000

James U. Jackson, former vice-president of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., is of the opinion that the city would take a long step in the direction of progress if it should acquire the control of that company, and, through a commission named for the purpose, undertake to operate the railway and the power plant. The property is now in the hands of the J. G. White Management Corporation as operating managers, with J. Q. Brown, president, and J. H. Pardee and J. K. Choate as vice-presidents.

MR. JACKSON EXPLAINS HIS OPTION

Mr. Jackson says he has an option on 20,000 shares of the common stock of the company at $10 a share and on 2,500 shares of preferred stock at $25 a share, making the total cost to the city $262,500 for the control of a property that at present prices for material could not be duplicated for $10,000,000. He further explains that the company is not in default on any of its bonded obligations.

The total outstanding funded debt of the company and its subsidiaries is $6,539,000. There are also outstanding $2,250,000 of preferred stock and $2,250,000 of common stock. The preferred stock carries 6 per cent cumulative dividends. Dividends on the preferred were begun on Jan. 1, 1912, but were discontinued in July, 1914. The common has never paid any dividends.

SAVING POSSIBLE IF MANAGED LOCALLY

In concluding his statement Mr. Jackson said in part:

Appreciating the importance of bringing about such negotiation as would place the city in absolute control of the situation I have secured an option on control of the stock of the Augusta-Aiken Company. This control will be 20,000 shares of common at $10 per share, and 2,500 shares of preferred, at $25 per share, making a total cost to the city of $262,500. To duplicate the Augusta-Aiken property today at present prices for material and labor would cost $10,000,000. If this amount was to be raised by a bond issue, the bonds to yield this amount of money would have to bear not less than 8 per cent. The present outstanding bonds on the property—about $6,000,000—bear 5 per cent, equal to a saving of $500,000 per annum.

I appreciate the fact that the Augusta-Aiken property, like all public utilities, has suffered seriously financially, but it has managed to take care of its interest charges. If managed locally under the plan suggested a big saving would result from its operation.

Some objection to the plan will be presented by those who oppose municipal ownership, or government control. As long as the governments—national, state and municipal—have the power of controlling all revenue, such as rates for passengers and freight, and also revenue from power companies, it is only a question of time when private control is sure to cease, and I believe Augusta, by this negotiation, will be the pioneer in solving a most serious problem now confronting our country, especially in all communities where conditions are like those in Augusta; viz., the municipality already owning a power plant and selling current to users of power. As Grover Cleveland once said in a message to Congress: "It is a condition which confronts us, not a theory."

Interest Not Paid

Company at Toledo Unable to Cope with Mounting Costs Under Limited Fares

Frank R. Coates, president of the Toledo & Western Railroad, notified the holders of the $1,500,000 of first mortgage 5 per cent gold bonds that the company would not be able to meet the interest payments due on July 1. This is the first time that an interest payment on this issue has been passed. There is a second mortgage of $500,000, the interest on which has not been paid for five years.

OPERATING PROBLEMS INSURMOUNTABLE

The road operates between Toledo and Pioneer with a branch to Adrian, Mich. The Doherty interests took it over in 1913. A statement of the company says:

> The gross revenue between the years 1914 and 1919 inclusive increased from $367,000 to $533,000. During the same period the operation and maintenance increased from $307,000 to $546,000. The interest charge for the two issues of bonds amounted to $75,000 a year, which has not at any time during this period been earned in full. In 1919 the road did not even earn enough to pay operating expenses by some $12,000. During the first five months of 1920 the road has not earned its operating expenses by about $34,000.

President Coates says that the company has made every possible effort to develop its business along profitable lines, but has been unable to cope with the problems of rapidly mounting costs of operation in the face of limited fares and rates for service. No early improvement is seen in the present outlook.

The Cleveland Trust Company is trustee under the terms of the indenture securing the first mortgage bonds on the property.

Approval of Reorganization Sought

Application has been made by the United Railroads, San Francisco, Cal., the Market Street Railway and by the reorganization committee of the United Railroads, headed by Frank B. Anderson, for approval of the reorganization plan of the United Railroads of San Francisco. The plan has been public for several months and the application is merely the formal presentation to the commission.

The application recites a gross value of the properties of $56,442,527. It also estimates the outstanding funded obligation and stock of the Market Street Railway, which is to take over all of the properties and franchises of the United Railroads, to be $47,973,000. Of this total $15,823,000 are Market Street Railway bonds and five-year notes. The remainder is divided as follows:

Preferred stock	$5,000,000
Second preferred stock....	$4,700,000
Common stock	$10,700,000

The details of the reorganization plan have been referred to previously in the ELECTRIC RAILWAY JOURNAL. They have been modified slightly several times.

Court Orders Suspension of Interurban Line

Justice Wheeler in the Supreme Court at Buffalo, N. Y., on July 1 handed down a decision allowing the Buffalo & Lake Erie Traction Company to discontinue its lines within the State of New York. The application was made thus early by George S. Bullock, receiver for the railroad, in order that people along the line may become accustomed to the change and be given time to devise other means for transportation and for the shipping of freight. The order reads that the discontinuance will not take effect until Sept. 15. The request of the company that it be allowed to dismantle the road is denied. The court directs that the receiver advertise for bids for the property in full or in part and to report such bids to the court on Sept. 1. The line between Fredonia and Dunkirk is excepted from the order. The court believes this section of the road can be operated successfully.

Financial News Notes

New Director for Southern Road.—J. P. V. Davis, vice-president of the National City Company, New York, N. Y., has been elected a director of the Piedmont & Northern Railway, Charlotte, N. C.

Call for Bids for Transit Bonds.—Bids for the $4,000,000 city loan authorized recently by the Council of Philadelphia, Pa., for completing and equipping the Frankford elevated line will be opened on July 14 in the Mayor's office. The bonds will bear interest at 5 per cent per annum, the highest rate paid by the city for many years.

Must Borrow to Pay for Paving.—The Georgia Railway & Power Company, Atlanta, Ga., has filed a petition with the Railroad Commission asking permission to issue three notes to cover paving costs in North Marietta Street, Atlanta, assessed against the company by the city. The notes amount to a total of $37,340, the company stating in its petition that the notes are necessary as funds are not available to pay the paving costs at this time.

Grafton Sale Set for July 14.—The period of ten days has expired in which the creditors of the Grafton (W. Va.) Traction Company and the Grafton Light & Power Company could have appealed to the United States District Court from the action of the referee in bankruptcy, Attorney O. E. Wyckoff, in ordering the property of the two concerns to immediate sale. In consequence the trustee in bankruptcy, Dr. T. F. Lanham, has fixed July 14 as the day upon which he will offer all the properties at auction.

Arranging for Houston Loan.—Luke C. Bradley, district manager for Stone & Webster, left Houston, Tex., on June 4, to arrange to borrow $1,000,000 to finance the proposed extensions to the railway lines of the Houston Electric Company if the new franchise there is approved. He is quoted as follows: "We will of course not need the money if the franchise is not granted, but I want to make all arrangements so that we can carry out our part of the contract. On my return I will tell the people frankly whether we can get the money."

Consolidation Rumor Revived.—With a view of an early resumption of negotiations for the merger of the city lines of the Washington Water Power Company and the traction division of the Spokane & Southeastern Railway & Power Company in Tacoma, Wash., operating officials of the two systems have begun to revise plans, figures and estimates made two years ago, when the merger was actively under consideration. D. L. Huntington, president of the Washington Water Power Company, says it is planned to organize a new company to take over the local properties of the two companies. At one time the proposal was for the Washington Water Power Company to purchase the traction system.

New Successor Company Organized.—The trustees of Boston (Mass.) Elevated Railway have completed the organization of the Hyde Park Transportation District, which is a corporation created by recent act of the Legislature to take over and operate in behalf of the city of Boston the railway lines in Hyde Park district now operated by Eastern Massachusetts Street Railway. John F. Stevens, one of the trustees of Boston Elevated Railway, has been elected president of the new corporation. All preliminary steps required of trustees of the Boston Elevated Railway have now been taken, and they are in a position to take charge of the railway service in Hyde Park as soon as the act becomes operative under its terms.

Dissolutions and Reductions in Capital in Illinois.—Six companies included in the Illinois Traction System have filed notices of dissolution with the Secretary of State of Illinois and six other companies have filed notice of decreases in capital stock. The companies dissolved are as follows: Danville Street Railway; City Electric Railway, Ottawa; Springfield & Northeastern Railroad, Champaign; Peoria, Streator & Ottawa Railway, Champaign; and Springfield Belt Railway, Champaign. The companies decreasing capital stock are: Bloomington & Normal Railway, Electric & Heating Company, $60,000 to $5,000; Consumers' Heat & Electric Company, Bloomington, $125,000 to $5,000; Consumers' Light & Heat Company, Bloomington, $100,000 to $5,000; Decatur Light, Heat & Power Company, $250,000 to $5,000; and Decatur Traction & Electric Company, $250,000 to $5,000.

Traffic and Transportation

Fare Order Vacated

Circuit Court Judge Rules Commission Based Milwaukee Rates on Excessive Valuation

That there is no question as to the power of the State, acting through the instrumentality of its Railroad Commission, to change the rate of fare fixed in a franchise, was the opinion of Judge Stevens of the Dane County Circuit Court as expressed in a decision handed down June 21, 1920, in the case of City of Milwaukee vs. Railroad Commission of Wisconsin, the Milwaukee Electric Railway & Light Company, et al. Judge Stevens held, however, that the rates of fare fixed by the order of the commission of Oct. 30, 1919, and applying to the city and suburban areas of Milwaukee, were unreasonable because of claimed errors on the part of the commission in arriving at the valuation of the property of the Milwaukee Electric Railway & Light Company.

City Appeals to Court

In June, 1918, the commission authorized the company to increase its rates of fare for the single fare area by discontinuing the sale of six tickets for 25 cents, making the fare 5 cents flat. A further increase to 7 cents cash, six tickets for 35 cents and eighteen tickets for $1 was authorized by the commission on Oct. 30, 1919. This was later modified to permit the sale of nine tickets for 50 cents.

There was a provision in the franchise of the company that the fare "shall be not to exceed 5 cents." The city of Milwaukee claimed that this constituted a contract and that the fare could therefore never be raised above the rate fixed by the franchise. It appealed both orders of the commission above referred to to the Dane County Circuit Court.

Valuation Reduced

While the case was before the Dane County Circuit Court, the question of a further increase in rates was again brought before the Railroad Commission because of the necessity of increasing the wages of the employees in the transportation department of the company and because of an increase in the cost of coal. In an order issued June 24, 1920, a further increase in fare was authorized by the commission. It pointed out, however, that it based the latest rates established for Milwaukee on a valuation of the company's property revised to conform with the opinion of Judge Stevens. The commission's decision is discussed at length elsewhere in this issue.

In his opinion in the case Judge Stevens points out that the commission not only fixed a value that equaled the cost of reproduction new, but allowed a depreciation reserve which was approximately $2,000,000 in excess of the amount needed to keep the investment intact and the plant in 100 per cent condition, had it been given the depreciated value which should have been given to it in view of the fact that it was in only 86 per cent condition. These findings of the commission, says Judge Stevens, led it in its order of Oct. 30, 1919, to fix a rate of fare which would yield more than a reasonable return upon the fair value of the property of the defendant company. The court says further:

> The rates here in question are all based upon the valuation made as of Jan. 1, 1914, with additions since that date. The fundamental error of the commission was in accepting the cost new as the fair value of the property, which was found by the commission to be in only 86 per cent condition * * * In arriving at the conclusion that the rate fixed by the order of Oct. 30, 1919, is unreasonable, the court has not overlooked the fact that the commission in accepting the cost of reproduction new as the fair value made no additional allowance for working capital or going value.

The court concludes that the matter must be returned to the commission for further consideration. It is reported that the commission will appeal the case to the higher courts.

Asks 7 Cents in Fort Wayne

The Indiana Service Corporation, Fort Wayne, Ind., has filed with the State Public Service Commission a petition for increased fares on the Fort Wayne city lines. A 7-cent cash fare with four tickets for 25 cents is asked. The petition states that the revenues for the year 1919 were only sufficient to pay a return of 2.9 per cent upon the valuation of the city lines.

Revenue from city operation during the year amounted to $691,342. Interurbans paid $39,467 for the use of the tracks, making the total revenue $730,809. Total expenses amounted to $649,482, leaving net available, on an investment of $2,780,000, the sum of $81,327. A total of 14,026,200 revenue passengers were carried during the year. Transfer passengers carried numbered 2,805,202.

With the petition the company submitted a detailed report of the traction situation in Fort Wayne which will be issued in pamphlet form and distributed to patrons. Robert M. Feustel, president of the company, sums up the case as follows:

> We are just as anxious as every one else to help reduce the cost of living. Our industry is necessary to the life of the community. We have not earned enough to maintain the property adequately and pay bond interest on the old rate of fare, and that fare has been increased only 18 per cent while the average wages and cost of materials has increased over 80 per cent. It requires no calculation to tell the answer. Every one of our patrons knows that the fares must be raised and they have known it for more than a year past.

Interurban Rates Up

Commission Allows Indiana Roads to Charge 3 Cents a Mile—Increase in Coal Cost

Three interurban systems operating in Indiana were granted increases in passenger rates by the State Public Service Commission on June 24, the increases to take effect July 1. The three companies are the Terre Haute, Indianapolis & Eastern Traction Company, the Union Traction Company of Indiana and the Indianapolis & Cincinnati Traction Company. Rates for traction lines in Indiana have been 2¾ cents a mile since Jan. 1, 1919. The new ruling gives the three roads authority to increase their rates to 3 cents a mile, the same rate prevailing on steam roads. The action places these roads on a parity with similar roads in Illinois, Michigan and Ohio.

Valuation of $32,000 a Mile

A valuation of $32,000 a mile in the case of all three companies was used as a rate basis by the commission, which held that such a valuation was conservative. Advanced cost of coal is stated as the principal cause of the necessity for fare readjustment, though the evidence revealed continued upward trend in the cost of all other items of maintenance and operation.

At hearings before the commission the evidence showed that coal which ten years ago cost traction companies from 30 to 80 cents a ton at the mines, according to market conditions, and that was transported on freight rates which ran from 50 to 65 cents a ton, according to destination, now is costing approximately $4 a ton delivered. Increased cost of coal, labor, materials and supplies used in the maintenance and operation of these utilities, as shown in the finding, would, if present rates were continued, reduce the earnings to approximately 3 per cent or less.

New Rates Inadequate

The commission's order further indicates that the advance from 2¾ cents a mile to 3 cents a mile will not offset entirely the increased cost of the upkeep of the roads. Estimates of the commission indicate that in the case of the Union Traction Company of Indiana the earnings under the new fare system will be only 5 per cent on the valuation of $32,000 a mile, with no allowance for depreciation.

In a similar estimate the earnings of the Terre Haute, Indianapolis & Eastern Traction Company would be 5.3 per cent, including 1 per cent for depreciation on equipment, and for the Indianapolis & Cincinnati Traction Company, 8.3 per cent with no allowance for depreciation. Officials of the various companies realize that these rates are inadequate, but they say that they cannot go beyond the fares of competing steam roads without largely cutting down their volume of business. It is planned to secure a further increase by an advance in freight rates.

Milwaukee Fares Again Advance

Commission Allows Company to Raise Ticket Rates to Meet Wage Increase—Valuation Reduced

An increase in fare within the single fare or city area of Milwaukee, Wis., is authorized by the Wisconsin Railroad Commission in a decision handed down June 24, 1920. The increase is intended to provide additional revenue with which to pay an increase in wages to the employees of the transportation department of the Milwaukee Electric Railway & Light Company, recently recommended by the State Board of Conciliation. The commission confirmed the wage award and now orders the company to make it effective. The fare increase is also partly intended to offset an increase in the cost of coal.

THE new rates of fare became effective June 27, and will remain in effect until Jan. 1, 1921, unless sooner modified by the commission. Outstanding tickets will be honored, however, until July 10, next, after which they will be redeemed. The fare increase is effected through a reduction in the number of tickets sold for 50 cents from nine to eight. The sale of six tickets for 35 cents is abolished. The cash fare is to remain at 7 cents as at present. The zone fares within the suburban area are also left unchanged. The wage increase ordered by the commission will, it is reported, amount to from 5 cents to 8 cents an hour.

Third Rise Since 1918

The present increase in fare is the third granted by the commission to the company since 1918. In June, 1918, the company was authorized to discontinue the sale of six tickets for 25 cents, making the fare 5 cents flat. On Oct. 30, 1919, the fare was further increased to 7 cents cash, six tickets for 35 cents or eighteen tickets for $1. This was modified in January, 1920, to permit the sale of nine tickets for 50 cents. An appeal from both of the above increases was taken by the city to the Dane County Circuit Court.

In a decision handed down June 21, 1920, Judge Stevens of the Dane County Circuit Court held the rates of fares established by the order of Oct. 30, 1920, that is the rates of fare just superseded, to be "unreasonable" because of claimed errors on the part of the commission in arriving at the fair value of the property. In commenting on its present order, the commission points out that the new rates established thereby are based on a valuation of the company's property revised to conform with the decision of Judge Stevens. Judge Stevens' decision is discussed at length elsewhere in this issue.

Labor Shortage Alleged

In its decision in the case the commission points out that the Board of Conciliation acting under Chapter 530 of the Laws of 1919 reported to it that increased wages were necessary "because at the prices now paid for labor by the Milwaukee Electric Railway & Light Company not enough labor is attracted to its service properly to conduct its operations to the satisfaction and accommodation of the public." The commission then points out that the act above referred to provides:

> That if the earnings of such public service business in which such employees are engaged are found to be sufficient to meet the cost of making the determination of said commission effective without depriving said corporation of a fair return upon the capital employed in such business as determined by the Railroad Commission, said Railroad Commission should order such public service corporation to make effective the wages, hours of labor and working conditions as determined by it to be fair, equitable and just. Otherwise, the commission shall provide for such a revision of the rates of such public service business as will enable it to meet such cost and yield a fair rate of return upon the capital employed therein.

Operating Costs Up $900,000

Acting in accordance with the mandate of the act the commission says that it found that as a result of increased wages of employees and also increased coal costs there would be a total estimated increase in operating expenses per annum of approximately $900,000. It then considered the railway income account for the Milwaukee city and suburban lines for the six months ended April 30, 1920, which, as adjusted, it believes reflects substantially the net results of operation under its order of Oct. 30, 1919. It found that the net revenue available for return under the rates of fare established by the last named order (the rates of fare just superseded)

> would give an actual annual return on the basis of six months' earnings of 7.2 per cent on the lower valuation now used by this commission in accordance with the late opinion of the Circuit Court of Dane County. At present, public utilities of the highest class can secure funds only at rates of interest netting a cost of somewhere around 9 or 10 per cent. This company must secure funds for very heavy additions and extensions now being made and for new equipment which is being manufactured. The budget of capital expenditures for the year 1920 contemplates the expenditure of over $9,000,000 in new property, of which $2,560,631 is solely for the street railway department. It is perfectly evident, therefore, that the actual return earned by the company under the order of Oct. 30, 1919, is not unreasonably high from any point of view. In fact a rate of return somewhat in excess of 7½ per cent is not unreasonable under present interest rate conditions, and if large additions at present cost of capital are to be made, the higher interest rates for the additional capital expenditure must be allowed for. In this connection, also, it is to be borne in mind that not all of this actual return is available for distribution to security holders, as at least $140,000 a year has to be retained in the reserves.

On the subject of valuation the commission says that, by its order of Oct. 30, 1919, it found that the fair value of the railway property within the single fare and suburban area, inclusive of allowance for materials and supplies, was $17,508,732. It then states:

> The Circuit Court of Dane County has determined an appeal that the commission was in error in its treatment and use of depreciation in connection with the arrival at fair value. Pending final decision of the valuation matter, the commission will act in full compliance with the opinion of the Circuit Court of Dane County, and the order in this case will be based as nearly as possible upon the conclusions of the Circuit Court of Dane County on the valuation question. The condition of the property on Jan. 1, 1914, was found by the State Engineering Department to be 86 per cent. As we understand the opinion of the court, it was that this percentage of condition should be used in arriving at fair value at the present time.

On this basis and allowing for additions to property and $500,000 for going value, an item not previously included, the commission now finds a fair value of $16,020,057. Basing its calculations on this value, the commission came to the conclusion that in order to meet the estimated increase in operating expenses and at the same time to permit the utility to earn a fair return, an increase in revenue was needed. It therefore authorized the company to increase its fare by readjusting the ticket rate.

In conclusion the commission said:

> "We have already called attention in several cases . . . to the great difficulty in estimating future operating expenses during the present time. Present conditions made it peculiarly difficult to adjust fares to a nicety to bring about a stated amount of income. A change in riding habit would affect the revenues one way or the other and many other elements may also enter into the situation. In view of this fact, it is deemed advisable by the commission to make the order herein a temporary order, the commission to pass upon the matter again after it has the benefit of the actual experience during the next few months.

City Attorney Williams of Milwaukee has announced that the city will appeal the fare increase decision immediately.

Chicago "L" Wants 10 Cents

Recent Wage Increase Is Important Factor—Higher Rate Would Yield Return of 4¼ Per Cent

Britton I. Budd, president of the Chicago (Ill.) Elevated Railways, has petitioned the Illinois Public Utilities Commission for permission to charge a 10-cent cash fare in Chicago between all stations south of Howard Street, the north city limits, a 6-cent cash fare north of Howard Street through Evanston and Wilmette, and 14 cents for an Evanston-Chicago ticket, instead of the present 12 cents. The rate of fare within the city at present is 8 cents cash or two tickets for 15 cents.

In his testimony before the commission, Mr. Budd estimated that the 10-cent fare would produce a gross revenue of $18,853,750 a year; that the total operating expenses would be $15,223,840, leaving $3,629,910 for net earnings. This would provide a return of about 4¼ per cent on the original cost of the system, which was fixed at $85,554,355. It was pointed out that under the 5-cent fare in 1918, the company's net earnings were $3,512,781.

$1,756,512 Wage Advance

The chief item in the bill of expenses presented by the company is the labor cost. The new wage scale which was recently granted, retroactive to June 1, and providing an increase of 15 cents an hour to nearly all employees, produces an estimated increase in the payroll of the 5,564 employees of $1,756,512 a year.

It was stated that on the present rate of fare the loss for the year would be

about $2,000,000. In addition, the roads are now in debt about $2,000,000 and defaulted last July on interest payments. No dividends have been paid on stock since 1914. Last month, it cost 8.4 cents to carry each passenger. It was also claimed that the companies need $1,000,000 for improvements in order to lengthen platforms and put on eight-car trains. The following detailed statement during the consolidated income of the several elevated roads for February, March and April, this year, as submitted to the commission, follows:

Passenger revenue	$3,717,874
Other transportation revenue	159,165
Total	$3,877,040
Way and structure	456,580
Equipment	408,736
Power	426,295
Conducting transportation	1,547,284
Traffic	7,015
General and miscellaneous	177,536
Total operating expense	$3,023,450
Net operating revenue	853,589
Taxes, special assmts. and city compensation [est. accts.]	272,324
Operating income	$ 581,265
Non-operating income	24,547
Gross income	$ 605,821
Deduct rentals	76,372
Bal. for interest charges	529,440
Interest on funded and unfunded debt	617,872
Sinking fund [three months' accruals]	31,350
Total interest and sinking fund charges	649,122
Net loss	$ 119,681

Ten-Cent Fare in Seattle July 19

Mayor Hugh M. Caldwell of Seattle, Wash., has signed the ordinance providing for a 6½-cent ticket fare and a 10-cent cash rate on the lines of the Seattle Municipal Railway. The bill will become effective on July 19. The new fare schedule provides for the following rates on city cars: 10-cent cash fare; 7½-cent cash fare for each of two persons riding together; 6¼-cent metal tokens, each good for one fare, to be sold on all cars in lots of four for 25 cents, eight for 50 cents, sixteen for $1, but not singly; free transfers with cash or token fares; 3-cent fares for school children, except that two may ride for a nickel; ten school tokens for 25 cents.

A supply of 2,000,000 metal tokens has been ordered, at a cost of $17,000.

In signing the ordinance, Mayor Caldwell said:

> This may not be just the best plan, but we need additional finances for the railway, and seven members of the Council have agreed upon it. I am willing to try it out.

P. R. T. Suspends New Rates

The Philadelphia (Pa.) Rapid Transit Company on June 30 suspended the schedule calling for a universal 3-cent transfer charge, which it had planned to install on July 1. This action was taken at the request of the State Public Service Commission pending further hearings to determine the system's need of an increase in revenue. It is reported that the company plans to withdraw the 3-cent transfer charge and to substitute therefor a zone fare.

Dallas Increase Effective

Company Begins Charging Six-Cent Fare—Riders Prepared for New Rate By Publicity Work

The Dallas (Tex.) Railway put a flat 6-cent fare into effect at midnight on June 26. The fare ordinance as passed by the City Commission authorized the new rates to become effective at midnight on June 26, but the company desired additional time to change its fare boxes so as to receive the pennies and also to conduct a campaign of education so that the people might learn how best to pay the new fares.

The fare boxes on all cars of the company were changed so as to receive and register pennies. The bottom of the boxes were taken out and false bottoms installed so that a large receptacle would thus be provided for receiving the pennies. For the present it is not possible to change all the fare boxes so that they will register pennies, according to Richard Meriwether, vice-president and general manager, and small boxes will be installed to receive the extra pennies. Mechanism for registering the 1-cent pieces has been ordered and should arrive in time to be installed in all fare boxes within six weeks.

Mr. Meriwether estimates that the company will receive on an average of between 75,000 and 100,000 pennies each day under the new fares. No additional clerks will be needed to count these, since counting machines will be installed. The additional fare is expected to increase the company's receipts between $700 and $1,000 a day, Mr. Meriwether said.



THIS "AD" PAVED THE WAY

Publicity Work Effective

The smoothness with which the higher rate was placed in effect was due in a large measure to the advertising and publicity campaign that had been carried on by the company under the direction of its publicity department. Large display advertisements were carried in the Dallas newspapers as soon as the fare increase was granted, explaining graphically how fares should be paid. Car cards were also posted in all cars, and extra issues of *Trolleygrams*, the company's publication, was published and distributed to car patrons. The publicity work in paving the way for the increased fares was carried on under direction of Frank Baldwin, assistant director of publicity of the company.

Mr. Baldwin prepared a series of newspaper advertisements, one of which is herewith reproduced. As editor of *Trolleygrams*, Mr. Baldwin also had published 20,000 each of four special editions of this publication which were distributed on the cars.

Seven-Cent Fare for Dayton

To end the tie-up of electric railway service in Dayton, Ohio, resulting from a strike of the companies' employees, the Dayton City Commission has authorized the several roads operating the local lines to raise their fares from 5 cents to 7 cents. Eight tickets are to be sold for 50 cents. Children are to be carried at 4 cents each. Universal free transfers will be retained under the new plan.

The new rates are to go into effect on the date when the companies come to an agreement with their striking carmen. The companies have offered the men a scale of 60 cents an hour. The increase in fares affects the Dayton Street Railway, the City Railway, the Oakwood Street Railway, the Dayton, Springfield & Xenia Southern Railway and the People's Railway, which operate the local lines.

The railways are still paying their share of improvements made under the $1,000,000 bond issues that became effective under the regime of City Manager Henry E. Waite. Officials of the various roads have announced that the lines at the present moment are in need of new equipment that would mean an outlay of $760,000. The City Railway needs at least twenty new cars, the Oakwood Street Railway at least ten, and the Dayton Street Railway ten. The roads are also in need of other equipment.

Charts recently submitted to the city authorities show that expenses during the first three months of 1918 and of 1919 were greater than revenues, but that during the first three months of the present year revenues exceeded operating expenses.

Transportation News Notes

Merchants Favor Higher Fare.—The Retail Merchants' Association of Port Arthur, Texas, has indorsed the application of the Port Arthur Traction Company for an increase in fare from 5 cents to 8 cents. The resolution states that business men recognize the necessity for an increased fare, and that the traction company cannot continue to maintain efficient service on the present fare.

Rate Plea Follows Wage Rise.—The Atlantic Coast Electric Railway, Asbury Park, N. J., was given a hearing before the State Board of Public Utility Commissioners recently on its application to increase its fare from 6 to 8 cents. The company claims that it has to face an additional cost of $49,000 a year because of a raise in the wages of the employees. The company has paid no dividends on the capital stock since 1917.

Seven-Cent Fare, Skip-Stop Allowed.—The New Jersey Board of Public Utility Commissioners has authorized the Five-Mile Beach Electric Railway, Wildwood, to increase its fare from 6 to 7 cents and to install the skip-stop to facilitate service. The company stated that there was an increase of $14,500 in operating expenses for the present year. There was no opposition to the application from the municipalities in which the company operates.

Higher Fare vs. City Ownership.—The City Council of Danville, Va., has adopted a regulation providing for a thorough examination of the books of the Danville Traction & Power Company to determine if the company is in need of an increase in fare from 5 cents to 6 cents. An appraisal of the company's property is to be made by public accountants. In the event that the city and the company fail to agree on the 6-cent fare the resolution stipulates that the city shall make an offer to buy the railway system.

Mid-Day Fares Reduced.—The London County Council of London, England, put into operation on April 19 its new scheme of reduced fares in the middle of the day and at the same time increased fares began at other hours. Between 10 a.m. and 4 p.m. the fare is 2d. for any distance beyond the 1d. stage. So far as one can judge by casual observation, the cars do not seem to be much fuller during the slack hours than they were before. The hope is to develop a much greater mid-day traffic.

Downpour Causes Suspension of Subway Lines.—Service of the Fourth Avenue and Broadway lines of the Brooklyn Rapid Transit subway and on the Lexington Avenue line of the Interborough was suspended for six hours during the night of June 24 because of a heavy downpour. The sewers became overtaxed and the ventilator gratings of the subway systems served as drains. This resulted in flooding the subways. Pumps had to be used to check the rise in water. Service was restored in time for the morning rush hour.

Pay-Enter System in Los Angeles.—The pay-as-you-enter system is to be installed on all city lines of the Los Angeles (Cal.) Railway. The hand registers will be discarded. Lines running outside the city where the fare varies according to distance will retain the present system. The one-man safety cars, which are being delivered for service in the outlying districts, are equipped with the fare box which will be uniform throughout the system. The boxes are being delivered at the rate of 500 a month and some are now in use. The pay-as-you-enter system will be completed by the end of the year, according to present plans.

Asks Court to Bar Fare Rise.—Court action has been resorted to in an effort to set aside the recent order of the Shreveport (La.) City Commission granting the Shreveport Traction Company authority to charge a 6-cent fare. The order was passed by the commission after a referendum election in which a majority of the voters indorsed the higher fare. Huey P. Long, a member of the commission, has filed a petition in the State courts, seeking a restraining order against the City Commission and the Shreveport Traction Company to restrain both from enacting such an order and from putting the authorized increased fare into effect.

Jitney Routes Not Yet Decided.—The utilities committee of the City Council of Seattle, Wash., has indefinitely postponed the determination of the routes and schedules under which jitneys will be permitted to operate in the streets of the city. In the meantime, jitneys will be permitted to continue the use of their old routes. Members of the committee will make a study of the proposed schedules before announcing the routes to be followed. Two petitions, containing a total of 40,000 names, have been presented to the City Council by the jitney drivers, protesting against the proposed action to place the terminals for buses outside the central business district.

Rate Complaint Dismissed.—A complaint made by the commissioners of Stark County, Ohio, against rates charged by the Northern Ohio Traction & Light Company, Akron, Ohio, has been dismissed by the Ohio Public Utilities Commission. The county authorities charged the company with violating the terms of its Canton-Beach City and Canton-Massillon franchises by charging a higher rate to through passengers than it charged other riders. The commission held that the mere fact that a through rate, which is not fixed by franchise, exceeds the sum of fares between intermediate points, some of which are fixed by contract, does not warrant the commission in holding that the through rate is unreasonable or unjustly discriminatory and should be ordered discontinued.

Wants More in Oklahoma City.—Application has been made to the City Commission of Oklahoma City, Okla., by the Oklahoma Railway for permission to raise its fare from 5 cents to 7 cents and to sell tickets at the rate of four for 25 cents. The company's request will be submitted to a committee to be appointed by Mayor Walton, which will determine if the higher rate is necessary. In asking the increase John W. Shartel, general manager of the company, stated that the company is now hauling 80 per cent more passengers with the same number of cars than in 1916. In 1916 the revenue was 25 cents for each car mile, while the expenses were 16 cents for each car mile. At present revenue and operating expenses amount to 40 cents a car mile, so that the system is just breaking even.

Still Fighting Buffalo Rate.—Failing in their attempt to secure a reduction in the fares charged by the International Railway, the municipal authorities of Buffalo, N. Y., have announced their intention to appeal the case to the Supreme Court of the United States. The 7-cent fare, which was placed in effect on April 18, was to have reverted to 5 cents on June 1. The company, however, has continued to collect the higher rate. The City Council has been asked to direct Corporation Counsel Rann to take steps to protect the rights of car riders if the city wins its fight to have the 7-cent fare order of the Public Service Commission vacated. It is also planned to demand that the company furnish rebate slips and file a bond of $300,000 to guarantee repayments if it loses the case. The City Council has not yet acted formally in the matter.

Revokes Staten Island Franchise.—On the recommendation of Grover A. Whalen, Commissioner of Plant and Structures, the Board of Estimate of New York City has voted to revoke the franchise of the Richmond Light & Railroad Company, which operates in Staten Island. The company's fares were raised to 8 cents following the appointment of a receiver. Commissioner Whalen, in a report to the board, said the managers of the road had threatened "to compel the people to use the 8-cent cars by securing an injunction restraining the city from operating buses." Ten resolutions covering the termination of the franchise were passed by the board. Ninety days' notice was given the company in which to comply with conditions of the franchise, which, it is charged, were violated. At the same time it was voted to declare forfeited the company's agreement with the city through which it has been enjoying the use of the St. George viaduct.

Personal Mention

W. E. Riddle, superintendent of transportation of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio, has been made general manager of the company, to succeed V. M. Loudon, who has resigned.

I. A. Cottingham, for twenty-eight years chief engineer of the lines of the Southern Pacific Company in Texas, has resigned to become chief engineer and assistant general manager of the Houston, Richmond & San Antonio Traction Company, Houston, Texas, which is building 225 miles of interurban line in Texas.

Howard A. Holmes, assistant electrical engineer of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, has resigned to accept a position with Morris Knowles, Inc., Pittsburgh, Pa. Mr. Holmes has been in the service of the Pennsylvania-Ohio Electric Company, formerly the Mahoning & Schenango Railway & Light Company for a number of years.

Robert H. Stevenson has recently been made chief clerk to the comptroller of the Connecticut Company, New Haven, Conn. For the past two years Mr. Stevenson has been special accountant in the comptroller's department. He is one of the accounting members of the committee on registration and collection of fares of the American Electric Railway Association.

Raymond G. Carroll, former general manager of the Savannah (Ga.) Electric Company, has arrived in Galveston, Texas, to assume his duties as manager of the Galveston Electric Company. Mr. Carroll succeeds W. E. Wood, who has been transferred to Houston, Texas, to become general manager of the Houston Electric Company and the Galveston-Houston interurban line.

J. G. Phillips has been made general superintendent of the Mobile Light & Railroad Company, Mobile, Ala. Mr. Phillips was formerly general manager of the Gary (Ind.) Street Railway. Previous to that connection he was engaged on valuation work with Ford, Bacon & Davis, engineers. He was at one time connected with the Hudson Valley Railway, Glens Falls, N. Y., as assistant general manager.

M. S. Wade has been made treasurer of the Pacific Electric Railway, Los Angeles, Cal., to succeed the late I. W. Hellman, who died some time ago. Mr. Wade has also been made treasurer of the Fresno Traction Company and the other subsidiaries of the Pacific Electric. He entered the service of the company in 1902. Three years later he was made cashier and in 1913 he became assistant treasurer.

Heads N. Y. E. R. A.

T. C. Cherry Chosen President of State Organization at Its Annual Meeting at Bluff Point

At the annual meeting of the New York Electric Railway Association, held at Bluff Point, on Lake Champlain, N. Y., on Saturday, June 24, T. C. Cherry, vice-president and general manager of the Rochester & Syracuse Railroad, Syracuse, was elected president for the coming year. Mr. Cherry has long had a prominent part in the work of the State body and his election as president comes as a recognition of his many services in behalf of that organization. During the past year he has served as vice-president of the New York association.



T. C. CHERRY

Mr. Cherry is known to electric railway men as one of the most efficient operators of the Empire State. In the opinion of those who have been most closely associated with him in his work, his success in the transportation field has largely been due to the possession of two qualities: his thoroughgoing knowledge of electric railway problems and his ability to get things done. Electric railway transportation has been practically his life work and he has made a study of every part and phase of it. The knowledge thus gained he has put to good use in his work as an organizer.

Mr. Cherry was born in 1876. In 1898, after spending four years at Syracuse University and at the Syracuse Law School, he entered railway work as timekeeper on construction and track work and as rodman with the engineering department of the Syracuse Rapid Transit Railway. Two years later he was made superintendent of track of that company. Still later in 1900 Mr. Cherry went to Lorain, Ohio, as superintendent of construction of lines and served as dispatcher of the Lorain Street Railway, and from August, 1901, to December, 1903, he was general manager of the company.

Later Mr. Cherry served as superintendent of the Saginaw Valley Traction, Light & Gas Company, and still later as general manager of the Ohio Central Traction Company. Subsequently he became connected with the Buffalo & Lake Erie Traction Company, as general superintendent, serving in this capacity for three years. In 1912 he was made superintendent of the Utica & Mohawk Valley Railway, resigning three years later to become general manager of the Schenectady traction system.

He resigned later in the same year to join Allen & Peck, and took charge as general manager of the Annapolis Short Line. In 1916 he joined the Auburn & Syracuse Railroad and in the following year was appointed general manager for the receiver of the Beebe lines, with the exception of the Auburn & Syracuse, which remained separate. Upon the discharge of the receiver Mr. Cherry was appointed vice-president and general manager of the Rochester & Syracuse Railroad, the position which he now holds. He is also vice-president of the Auburn & Syracuse Electric Railroad and president and general manager of the Syracuse & Northern Electric Railway. All three of these roads are under the management of the firm of Peck, Shannahan & Cherry, Inc., Syracuse, utility operators, of which he is a member.

R. H. Waldo, supervisor of equipment of the Eighth Avenue Railroad, New York, N. Y., has resigned.

G. M. Patterson, traffic manager and purchasing agent of the Fort Wayne & Northwestern Railway, Kendallville, Ind., has resigned.

B. F. Ross, chief clerk of the Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, N. Y., has resigned.

George M. E. Vans has been made chief electrical engineer of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.

V. M. Loudon, general manager of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio, has resigned.

E. R. Gordon has been appointed superintendent of the Union Depot Bridge & Terminal Company, Kansas City, Mo., to succeed O. S. Lamb, resigned.

A. M. Ginn has been appointed chief clerk of the Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, N. Y., to succeed B. F. Ross, resigned.

William J. Boucher, whose appointment as assistant supervisor of way and structures of the Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, N. Y., was recently announced, has been promoted to acting supervisor of equipment of these roads.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Stocks of Railway Type Lightning Arresters Good

Traction Companies Less Insistent on Protection of Safety Cars Than Those of Large Type

Light demand for the railway type of lightning arrester is causing good stocks to accumulate with distributers. Although thunderstorms are now a factor with which railways will have to reckon, orders at present are light; even during the past spring months, when most of the buying for this sort of material was to have been expected, sales were small as compared with other years.

One of the things bringing about this condition is the financial straits in which many electric railways find themselves, with a resultant tendency on their part to eliminate all expenditures but bare necessities. Consequently, lightning arresters are one of the first classes of equipment to suffer, as it is a gamble whether or not an installation will be put to actual use. Another feature of the slack market is the growing use of one-man cars, a much lower percentage of which are equipped with lightning arresters than the two-man type. Some manufacturers find that the traction companies are more willing to take a chance on equipping their safety cars without lightning arresters than their larger cars, because of the smaller loss at stake in the former case if lightning should injure the car.

Deliveries are fairly good compared with other railway material, averaging for this class of goods from one to six weeks. The market is firm, no price fluctuation having been recorded in some months.

Bare Copper Wire Shipments Longer

Labor and Material Shortage at Mills Reflected More in Finer Than Larger Sizes

Manufacturers differ on conditions of the bare copper-wire market. On one side it is declared that demand is rather quiet, with few orders for export coming in. Domestic demand, however, is fair, with little heavy construction work being undertaken. On the other side of the question it is asserted that the volume of orders is large, while at the factory there is under-production owing to a shortage of raw material and labor. It is stated that production could be increased 60 per cent if sufficient men for a night force could be obtained.

Finer sizes of copper wire are especially hard to obtain, and shipments take longer than for the coarser material. Large sizes average six to eight weeks, while the smaller stuff runs from four to six months.

The market has held steady for the past three or four months with no prospect of fluctuation in sight, but if any change occurs the probability seems to point to its being upward. Bare copper wire is averaging about 22 cents base. Manufacturers report very few cancellations of orders, and collections are fair, most customers paying within the thirty-day or sixty-day time limit.

Results of Standardization in Brake Shoes

Number of Patterns Has Been Reduced —Price of Reinforced Shoes Often Less Than That of Cast Iron

In discussing the market situation in brake shoes an official of a large manufacturer of brake shoes for steam and electric railroads recently expressed gratification at the results from standardizing brake shoes on electric cars. Ten years ago or so, when the movement toward standardization was begun, a large number of patterns had to be carried in stock. Now there are practically only four styles of shoes, two for motor wheels and two for pony wheels. Different widths of wheel thread still require different widths of shoes, so that practically the makers of brake shoes have to carry some sixteen active patterns of shoes. This, in the opinion of the speaker, could be reduced somewhat. About 75 per cent of the tonnage of brake shoes turned out by this company for electric railway properties east of the Mississippi River is of the standard patterns mentioned.

While an increase has occurred in the price for brake shoes of this company, it has not been proportional to the increase in cost of materials, according to the statement. Formerly reinforced shoes sold for from $40 to $50 per ton. Now, while the price has more than doubled, the ordinary cast-iron shoe, obtained from a local foundry, will often cost the purchaser over $100 a ton. Yet the ordinary cast-iron shoe will have possibly only one-third of the life of a reinforced shoe.

While production is not quite up to manufacturing capacity, the standard shoes can be shipped directly from stock. For orders requiring the manufacturer to make up other than standard shoes, these will be filled when an opportunity is given to do so. No encouragement is given to trade in other than standards.

Raw material stocks are not available in amounts formerly gathered. A six months' stock is considered good now, where heretofore sufficient for two years' business was available.

Good Outlook for Carbon Brush Supply

Better Deliveries Being Made and Electric Railways Are Well Stocked Up

Manufacturers of carbon brushes report the situation as being very favorable. Production has increased generally, and though only nominal stocks of finished brushes are on hand, stocks of unfinished material are in good shape to handle any orders likely to come in.

Deliveries are being made more promptly than heretofore, averaging from ten days to three weeks. Shipments of the standard railway type of carbon brush are a little slower because these orders are being placed in larger quantities. One local agent who recently returned from a tour of the country states that electric railways are quite heavily stocked up on brushes.

Demand is good, much of the ordering being for replacements as well as for the construction of new motors. The market has held steady for some months, and manufacturers say no fluctuation is in sight at present. Labor, however, is the chief item in the cost of carbon brushes, and because the labor market has been unsteady indications are that any price change would be upward.

Stocks of foreign brushes are in sufficient condition in this country to supply normal orders, while new material can be quoted on six weeks' delivery. French production is about 50 per cent above pre-war volume.

Banner Year Seen in Metal Culvert Industry

Increased Railway Demand and Prompt Deliveries Features of Strong Market

Manufacturers of culverts report an appreciable increase in buying on the part of the railways over the past few years. Although by far the largest percentage of culverts manufactured now go under highways rather than railways, demand on the part of traction companies has greatly increased over the war period. In fact, sales thus far indicate that this will probably be the biggest year in metal culvert history.

Conditions of culvert production vary considerably. Certain producers have an output that is above normal, while other producers declare that shortage of labor, freight troubles and the indisposition of workmen to speed up as formerly have greatly cut production. The common ground on which producers meet, however, is that more culverts could be used if

available. Stocks of culverts are undergoing a rapid turnover. A number of mills have several months' supply on hand, or enough to fill reasonable orders from stock. Labor unrest is lengthening deliveries somewhat; particularly is a shortage of help making it difficult to receive and ship material. In spite of this condition, immediate shipments are the rule for such preferential customers as state highway departments and railways, other orders being quoted at from five to eight weeks.

Some shortage of raw material has been experienced by the mills, attributable to both an actual scarcity and to the freight tie-up. Prices have increased materially, one manufacturer reporting an advance of about 10 per cent last Jan. 1, and another increase of the same amount on April 1. The consensus of opinion seems to be that quotations have about reached their top level.

Cancellations are few, slowness of delivery being responsible for those that are made, but in general customers realize it is better to let orders stand, even with tardy shipments, rather than cancel and take a chance on still slower delivery elsewhere.

Collections in this line are on the whole considered good, bills being met on an average of sixty days.

Timber Owners Hesitate to Cut for Railway Ties

As if the car shortage alone were not sufficient to curtail the supply of wood ties, construction and repair work on rights of way are further hampered by conditions at the tie camps, which are seriously impeding production. Many owners of timber land think twice before cutting their trees for ties when the market is so strong for finished lumber at a much higher profit. And laborers will not work at tie camps when they can earn more money producing board lumber.

Consequently, although there is plenty of wood and plenty of labor, the wood tie situation does not offer much hope of improvement. Demand is holding strong and standard hewn ties of long leaf pine are being quoted around $1.50 each.

Rattan Car-Seat Market Fair

Material in Good Stock to Make Shipments in About Six Weeks

Although traction companies have not been ordering rattan car seatings in very heavy amounts this spring and summer, there have been inquiries which show that the matter is being given some thought. The tendency to make double seats into two single seats has effected savings in rattan in that only half the double seat has to be replaced to repair broken spots.

Shipments can be made in from four to eight weeks for standard width rattan, but for extra wide the quotations are running longer. Stocks in this country are fair and material is coming through from the Far East in good shape. At the same time freight rates are high and prices of the rattan at point of shipment are increasing. Further price changes up would not be unexpected, for the rates here have not changed to any great extent this year.

One feature tending to hold back shipments of finished rattan seats is the shortage of steel used in the underframe.

Pin and Bushing Deliveries Excellent

Volume of Sales Steady—Larger Output Can Be Absorbed—Higher Prices Unlikely

Deliveries from stock are being made, at present on treated pins and bushings, used in trucks and brake rigging, notwithstanding the burdensome conditions imposed upon many manufacturing interests by the inadequacy of rail transportation. From month to month the sales volume totals about the same as that of last year to this time, but looking at shorter periods sales are rather spasmodic. A representative maker of these products has about six months' raw material supply on hand, and this is proving a wonderful "shock absorber" in connection with the irregularities of railroad service. Cold-rolled steel bars are very difficult to procure, some orders having been placed six months ago without a sign of the material. Tubing comes through in about three weeks and gives relatively little trouble. Manufacturers are well caught up on orders for pins and bushings.

Notwithstanding the fact that manufacturing costs have been climbing upward of late, there has been no increase in the price of at least one well-known line of pins and bushings for eighteen months. Fuel oil, used in heat treating, now costs this producer 13 cents per gallon against a former price of 6 cents, and process heating costs something like $40,000 per year for oil alone. Certain chemicals used are obtained with no great difficulty and run to perhaps $1,200 per year.

Of late the fuel oil received in this plant has been so thick that it has been

NEW YORK METAL MARKET PRICES

	May 1, 1920	July 1, 1920
Copper, ingots, cents per lb.	19.25	19.00
Copper wire base, cents per lb.	23.00	22.50 to 23.00
Lead, cents per lb.	9.25	8.00
Nickel, cents per lb.	45.00	43.00
Zinc, cents per lb.	8.45	7.95
Tin, cents per lb.	61.50	49.00
Aluminum, 98 to 99 per cent, cents per lb.	33.00	33.00

OLD METAL PRICES—NEW YORK

Heavy copper, cents per lb.	16.50 to 16.75	15.00 to 15.50
Light copper, cents per lb.	14.00 to 14.50	13.00 to 13.50
Heavy brass, cents per lb.	10.25 to 10.50	9.00 to 10.00
Zinc, cents per lb.	5.00 to 5.25	5.00 to 5.25
Yellow brass, cents per lb.	9.00 to 9.50	7.00 to 7.25
Lead, heavy, cents per lb.	7.25 to 7.75	7.00 to 7.25
Steel car axles, Chicago, per net ton.	33.00 to 34.00	32.00 to 33.00
Old carwheels, Chicago, per gross ton.	36.00 to 37.50	36.50 to 37.50
Steel rails (scrap), Chicago, per gross ton	29.00 to 30.00	27.50 to 28.00
Steel rails (relaying), Chicago, gross ton	31.50 to 32.50	31.50 to 32.50
Machine shop turnings, Chicago, net ton	12.50 to 13.00	9.50 to 10.00

ELECTRIC RAILWAY MATERIAL PRICES

Rubber-covered wire base, New York, cents per lb.	28.00 to 30.00	28.00
Weatherproof wire (100 lb. lots), cents per lb	28.00	29.00
T rails (A.S.C.E. standard), per gross ton	55.00 to 57.00	58.00 to 65.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	55.00 to 57.00	57.00 to 59.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton*	45.00 to 47.00	55.00 to 65.00
T rail, high (Shanghai), cents per lb.	3.00	3.00
Rails, girder (grooved), cents per lb.	3.00	3.00
Wire nails, Pittsburgh, cents per lb.	4.00	4.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.00 to 5.00	3.85 to 4.25
Railroad spikes, screw, Pittsburgh base, cents per lb.	7.50 to 9.00	7.50 to 9.00
Tie plates (flat type), cents per lb.	3.00 to 4.00	3.00 to 5.00
Tie plates (brace type), cents per lb.	3.00 to 4.00	3.00 to 5.00

ELECTRIC RAILWAY MATERIAL PRICES

	May 1, 1920	July 1, 1920
Tie rods, Pittsburgh base, cents per lb.		
Fish plates, cents per lb.	3.00 to 4.00	3.75 to 4.75
Angle plates, cents per lb.	3.00 to 4.00	3.75 to 4.75
Angle bars, cents per lb.	2.45 to 4.00	3.75 to 4.75
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.50 to 6.50	6.00
Steel bars, Pittsburgh, cents per lb.	3.75 to 4.00	4.25 to 4.75
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	5.00 to 8.00	4.20 to 6.35
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	6.00 to 8.00	5.25 to 8.05
Galvanized barbed wire, Pittsburgh, cents per lb.	4.60	4.10 to 4.45
Galvanized wire, ordinary, Pittsburgh, cents per lb.	4.20	3.70 to 3.95
Car window glass (single strength), first three brackets, A quality, New York, discount†	17%	17%
Car window glass (single strength), first three brackets, B quality, New York, discount	37%	37%
Car window glass (double strength, all sizes AA quality), New York, discount	79%	79%
Waste, wool (according to grade), cents per lb.	24 to 29	21 to 24
Waste, cotton (100 lb. bale), cents per lb.	18	16
Asphalt, hot (150 tons minimum), per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	32.00	32.00
Asphalt filler, per ton	30.00	30.00
Cement (carload lots), New York, per bbl.	2.80	4.80
Cement (carload lots), Chicago, per bbl.	2.00	....
Linseed oil (raw, 5 bbl. lots), New York, per gal.	1.90	1.63
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	1.92	1.65
White lead (100 lb. keg), New York, cents per lb.	15½	15½
Turpentine (bbl. lots), New York, cents per gal.	3.00 and upward	1.75

* U. S. Steel Corp.
† These prices are f.o.b. works, with boxing charges extra

necessary to thin it with kerosene, costing 18 cents per gallon. Labor conditions are unusually good, however, in this establishment. It seems doubtful if prices of pins and bushings will go higher, and on some quotations there can be seen a tendency to shade former figures a little. If the railways come into the market well as the year goes on, giving the manufacturing interests plenty of work to do, it is highly probable that increased production will yield an output at unit costs which will permit the purchaser to secure material of this class without being obliged to pay more for it than present quotations imply.

Rolling Stock

Pacific Electric Railway Company, Los Angeles, Cal., has ordered new passenger equipment to the extent of $1,400,000, for delivery early this fall.

Dallas (Tex.) Railway Company, having just been granted permission to charge a 6-cent fare, is to purchase fifty new double-truck cars for immediate service.

Appalachian Power Company, Bluefield, W. Va., and Graham, Va., expects to purchase three city cars during the summer.

The Interstate Public Service Company, Indianapolis, Ind., has recently purchased an electric locomotive for use in handling freight trains between Jeffersonville, Ind., and Indianapolis. The cost of the locomotive, which is the first electric to be used in this section, will be about $24,000.

Burlington Traction Company, Burlington, Vt., has purchased two cars from the Emergency Fleet Corporation for immediate delivery. J. G. Brill Company is the maker.

The Louisville and Southern Indiana Traction Company, New Albany, Ind., lost a wire car recently in a head-on collision with a passenger car near Watson, Ind.

The Southern Pacific Company has completed arrangements for the purchase of twenty-two new Birney type safety cars for the San Jose Railroads. The St. Louis Car Company, builder, expects shipment the latter part of October.

Rochester, Lockport & Buffalo Railroad Corporation, Rochester, N. Y., has purchased for delivery the latter part of this year one double-end shear-nose snowplow and one new 20,000-lb. capacity express car.

Franchises

Central Texas Electric Railway, Waco, Texas.—The Central Texas Electric Railway will be granted a franchise by the Waco City Commission to permit the interurban line which it is now building from Waco to Temple to enter the city of Waco.

Track and Roadway

Connecticut Company, New Haven, Conn.—The Connecticut Company is making repairs on the Norwalk-Winnipank trolley line. The tracks have been torn up and will be re-laid level with the concrete.

Wichita-Walnut Valley Interurban Railway, Wichita, Kansas.—The charter for the Wichita-Walnut Valley Interurban Railway is about to be taken over by new interests. The road was organized with an initial capital stock of $1,000,000 in 1917 to construct an electric railway from Wichita through Butler County, a distance of about 35 miles. The actual right-of-way was secured and the contract was let for the construction, but the coming of the war prevented the carrying out of the undertaking. It is understood that the interests which originally promoted the road will retire entirely from the property. The affairs of the company at the present time are in the hands of A. H. Hill, vice-president.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway has received permission from the Quincy city authorities to alter the location of certain tracks and to re-locate its present tracks on Franklin, School and Hancock Streets.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway's passenger station at Playa del Rey was recently destroyed by fire. The damage is estimated at $3,500.

Cortland County Traction Company, Cortland, N. Y.—The Cortland County Traction Company has purchased one 1,500-kw. Curtis turbine and one 500-hp. Edgemore boiler.

Charlottesville & Albermarle Railway, Charlottesville, Va.—The Charlottesville & Albermarle Railway has purchased all the material for the rebuilding of its carhouse except the metal roofing.

Detroit (Mich.) United Railway.—The Detroit United Railway has received permission to lay a single-track line in Harper Avenue, Detroit.

Detroit (Mich.) Municipal Railway.—Bids are called for by the city of Detroit on approximately 20 miles of railway track comprising sections of the proposed $15,000,000 municipal electric railway system. The work will include excavating, concrete foundation, ties, rails and all track equipment.

Portland (Ore.).—A route for the proposed municipal electric railway line which is to connect the St. Johns line of the Portland Railway, Light & Power Company with the municipal terminal has been decided upon. Kellogg Street from its intersection with Fessender Street to the viaduct over the railroad tracks has been chosen.

Portland Railway Light & Power Company, Portland, Ore.—The Public Dock Commission will build an extension of the St. John's line of the Portland Railway, Light & Power Company to terminal No. 4. The line will be about 1 mile in length, and will cost approximately $40,000. Bids will be called for at an early date.

Trade Notes

The Chicago Pneumatic Tool Company, Chicago, Ill., announces the election of Allan E. Goodhue as vice-president in charge of sales.

The Power Plant Supply Company, 707 Canal Road, Cleveland, Ohio, has recently been organized to deal in power-plant equipment and pumping machinery. William E. Berrington is secretary and manager.

The National Railway Appliance Company has established a New England district office in the Little Building, 80 Boylston Street, Boston, Mass. W. C. Peters, New England department manager, will be in charge.

Chicago Fuse Manufacturing Company has now remodeled the plant which it acquired several months ago from the Otis Elevator Company on Fifteenth Street, Chicago, and is in much better position to market its products after thirty-one years of growth.

Theodore Malm, formerly electrical and traction engineer of the Toronto Railway Company, Canadian Northern Railway Company and various other interests under McKenzie & Mann management in Canada, has formed his own company under the name Theodore Malm & Company, with offices at 507 Fifth Avenue, New York City. It will deal exclusively in new and used car and station equipment and material.

The Electrical Manufacturers' Council met in its new office, 522 Fifth Avenue, New York, on June 18. Officers were elected for the ensuing year as follows: Chairman, S. L. Nicholson, Westinghouse Electric and Manufacturing Company; vice-chairman, Le Roy Clark, Safety Insulated Wire and Cable Company; treasurer, E. B. Hatch, Johns-Pratt Company. Frederic Nicholas was reappointed executive secretary.

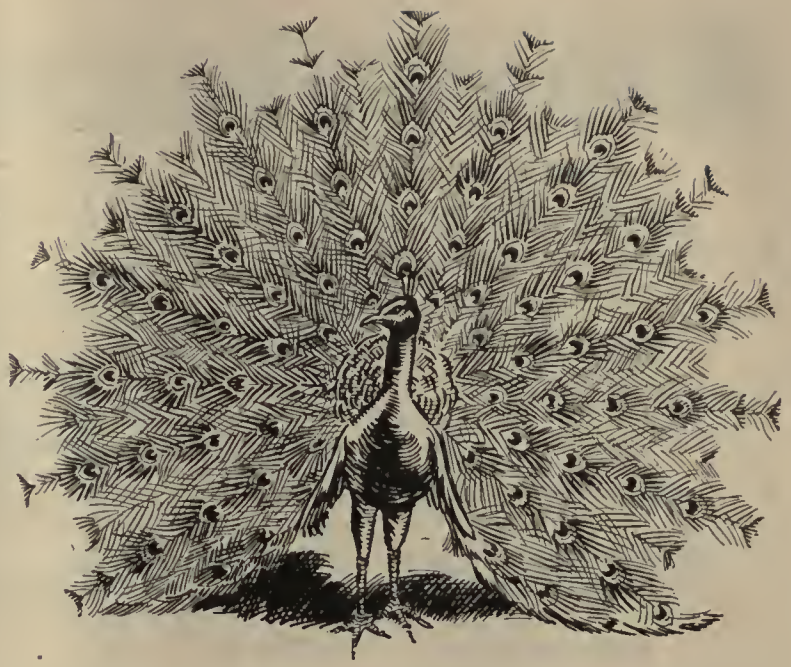
The Electric Controller & Manufacturing Company, Cleveland, Ohio, has opened a new office at 208 North Broadway, St. Louis, Mo., in charge of R. J. Ehrhart.

New Advertising Literature

Motors for Crane and Hoist Service.—The General Electric Company, Schenectady, N. Y., has issued bulletin No. 48119.1, describing its alternating-current motors for crane and hoist service.

Belt Fastener.—Crescent Belt Fastener Company, New York City, has just prepared an illustrated circular, form N. Y. 227, on "modern scientific methods in belt joining."

The Reputation of the Peacock Brake Puts Money in Your Purse Eventually



TODAY the purchase of some nameless brake that comes with the car like so much hardware may save a few puny dollars in first cost.

But *eventually* the wiser buyers find that the Peacocks which cost a little more to purchase are not only the cheapest to maintain but the best you can quote to a jury when the cause of an accident has been laid on the brakes.

Just say:

"We use the Peacock Brake on all our cars in every service because we have found that it bears out the experience of hundreds of other users as the safest, simplest and speediest brake obtainable."

And the verdict will be commendation instead of costly damages.

The SAFEST is the Cheapest!



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Bankers and Engineers

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Engineers.
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Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems
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ELECTRICAL—CIVIL—MECHANICAL
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Copper, Brass, Bronze Wire, Rods,
Copper and Brass Tubes
Colonial Copper Clad Steel Wire
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THE COAL & IRON NATIONAL BANK of the City of New York

Capital $1,500,000
Surplus $1,000,000 Und. Profits $363,051
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Offers to dealers every facility of a New York Clearing House Bank.

WE BUILD TRACKS

Construction—Maintenance—Rehabilitation
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SPECIALISTS IN
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EXPERTS IN
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Engineers
424 CHESTNUT STREET
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Compare Them



The faint light of a candle and the strong rays of a searchlight. They represent the comparative efficiency of other ways of finding what you want and advertising for it in the

SEARCHLIGHT SECTION

Employment Equipment Business Opportunities

613

J. L. JACOBS & COMPANY

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THE P. EDWARD WISH SERVICE

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DETECTIVES
Street Railway Inspection
131 State St. BOSTON

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POWER STATIONS
HYDRAULIC DEVELOPMENTS

Consulting Engineers
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ELECTRIC RAILWAYS

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80th Street and East End Ave., New York, N. Y.

Frederick Sargent
Wm. S. Monroe
A. D. Lundy
James Lyman
SARGENT & LUNDY, *Engineers*
1412 Edison Bldg., 72 W. Adams St., Chicago, Ill.

—how individual lubricating service reduces lubricating costs . . . . .

A Report From a Master Mechanic

60 cars with GE 57 and GE 67 motors:

With TULC:
Armatures are oiled every - 900 miles

With Oil:
Armatures are oiled every - 300 miles

Tulc Needs Only One-Third the Labor That Oil Requires

LABOR - -	66 per cent over oil saved
LUBRICANT -	66 per cent over oil saved
LUBRICATION	Perfect with no trouble
RESULTS - - -	Figure it out yourself

Write for our booklet

The Universal Lubricating Co.
Cleveland, Ohio
Factory: Sweeney Ave. Office: Schofield Bldg.

TULC+Universal Service



They Laugh at Short Circuits

Blowouts hold no terror for "Union" Renewable Fuses.

They stand up under a greater number of blowouts than any other fuse we know of. And it's easy to understand why when you consider that:

—The tube is made of extremely tough, specially made, fire-resisting fibre, reinforced on the *outside* of each end by metal ferrules which are both screwed and riveted on.

—The link vanishes when it blows, without violence or flash; and it is the very center of the link that melts; so the heat and gases are too far from the metal parts to corrode them or to fuse the nuts which hold in the link.

"Union" Fuses have a number of other points of superiority. But these alone have been considered of sufficient importance for hundreds of the country's biggest plants to adopt "Union" Fuses exclusively.

Whether you use Renewable or Non-Renewable Fuses, you'll find "Union" always dependable and their upkeep low. At your electrical dealers.

May we send you copy of our Fuse Booklet? Please ask your nearest branch.



CHICAGO FUSE MFG. CO.

Boston, Cleveland, Los Angeles, Detroit, Kansas City, Pittsburgh, Philadelphia, St. Louis, San Francisco, Seattle, Minneapolis, Indianapolis, Birmingham, Grand Rapids, Milwaukee.

CHICAGO NEW YORK

"UNION"

RENEWABLE FUSES



Reliability in a Crane

is the exact result of the quality and service built into it.

When you consider the expressed *satisfaction* of Toledo users—

—the standing of this Company—

—the substantial qualities of the Cranes themselves—

—and their *convincing demonstrators* in actual service—

You begin to understand why Toledo Cranes can be *relied upon* for speedy handling of all materials.

Let us show you.

The Toledo Bridge & Crane Co.

Toledo, Ohio

Birmingham Office, 1011 Empire Bldg.; Boston Office, 141 Milk Street; Buffalo Office, 610 Iroquois Bldg.; Chicago Office, 549 Washington Blvd.; Cincinnati Office, 414 Elm Street; Cleveland Office, 725 Citizens Bldg.; Kansas City, Mo., Office, Finance Bldg.; Minneapolis Office, 1124 Metropolitan Life Bldg.; New York Office, 52 Broadway; Philadelphia Office, 503 Real Estate Trust Bldg.; Pittsburgh Office, 203 Oliver Bldg.; San Francisco Office, Rialto Bldg.; St. Louis Office, Federal Reserve Bank Bldg.; Salt Lake City Office, 17 Exchange Place; Seattle Office, Hoge Bldg.



An Interurban Type

The Ohmer System

Interurban electric railway companies have made Ohmer fare registers a standard because many different fare denominations are accurately recorded, indicated and thoroughly protected.

City railway managers now realize that they also have a considerable variety of fare rates to be protected, and many Ohmer fare registers of types suitable for city service are being adopted. Cash fares in odd amounts, metal or paper tickets, school tickets, transfers, employes' passes, special passes, etc., are differentiated, indicated and properly recorded when Ohmer fare registers are used.

Operating equipments are made in every conceivable type for making Ohmer fare registers operative and absolutely satisfactory in every kind of car, and under any possible condition of service.

Don't experiment. Don't tie up your money unnecessarily. We finance the installation of Ohmer fare registers, and charge a modest rental as you receive the service. You will be in no danger of ever having a lot of obsolete devices on hand. Our contracts are flexible, and we are always ready to take care of changing conditions for you.

Ohmer Fare Register Company

Dayton, Ohio



A City Type

INTERNATIONAL Fare Registers



Type R-10—Single Register

The R-10 is the latest type of International Single Register, and is a full geared machine of the most improved and rugged construction. It is made largely of cold rolled steel parts, hardened at points of greatest wear. All parts are so accurately made that they are interchangeable without fitting. No castings of any kind are used.

The effectiveness of a fare collection system depends largely on its completeness. To be completely effective, every fare collection system should have a final visible and audible fare registration on overhead registers.

The necessity of checking passengers instead of money deposited becomes increasingly important. A fare register, operated by the foot when the fare is received, offers a sure method of checking the load against the receipts and is the most flexible method where rates of fare are changing.

International Fare Registers through the test of long service have shown themselves to be not only accurate and reliable in their registration, but so rugged in construction as to give enduring service. All parts are interchangeable, repairs few and easily made.

Let us send you detailed information.

The International Register Company

Manufacturers of Fare Registers and Railway Supplies, and General Selling Agents for HEEREN ENAMEL BADGES

Office and Factory: 15 So. Throop Street, Chicago, Illinois



The product of more than forty years specialized experience

Back of "Tiger Bronze" Axle and Armature Bearings are more than forty years of specialized experience. In this time numerous theories have been exploded and many claims disproved. Today, when necessity drives the maintenance chief more than ever, there is a brand tested by time and severest service, of recognized superiority. It is More-Jones "Tiger Bronze" Axle and Armature Bearings.

Employment of More-Jones "Tiger Bronze" is convincing proof of the fact that performance alone is the real test of a bearing.

More-Jones Products

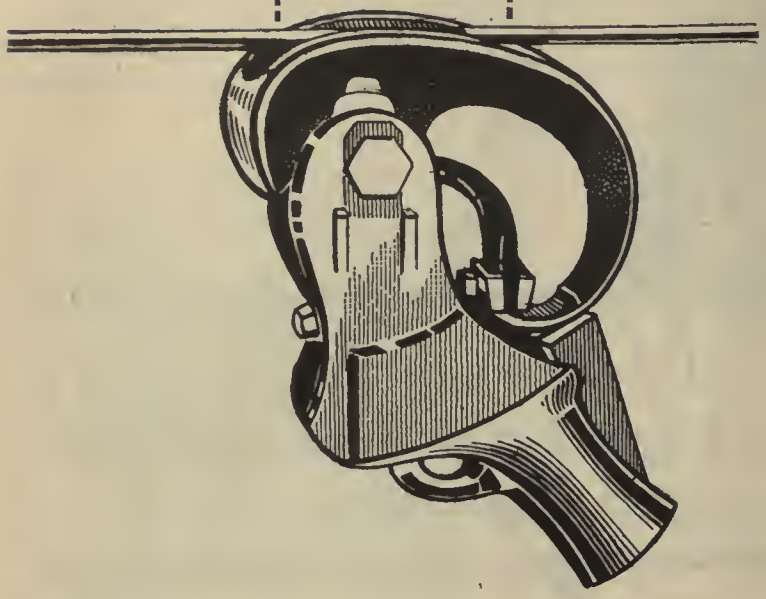
Trolley Wheels: V-K Oilless, M-J Lubricated, V-K Non-Arcing Harps.
Bearings: "Tiger" Bronze Axle & Armature Bearings.
Armature Babbitt and similar products.

Write for particulars

MORE-JONES BRASS AND METAL CO.
St. Louis, Missouri

TIGER BRONZE AXLE and ARMATURE BEARINGS

←3"→ CONTACT



In all current collecting devices the more contact you have the less friction exists owing to the tension being distributed over a greater surface.

Miller Trolley Shoe operation proves that the greater the contact surface more power is delivered to the motors, giving greater capacity for overloads.

THE MILLER TROLLEY SHOE

has a contact on the wire of 3 inches. This contact is permanent. The Shoe follows each little unevenness in the wire. It does not jump and eliminates all sparking.

Miller Trolley Shoes have solved many problems that were the outcome of low voltage.

We stand ready at all times to show you on your own lines just what an advantage can be obtained by equipping your cars with the Miller Trolley Shoe.

Write Today for Details

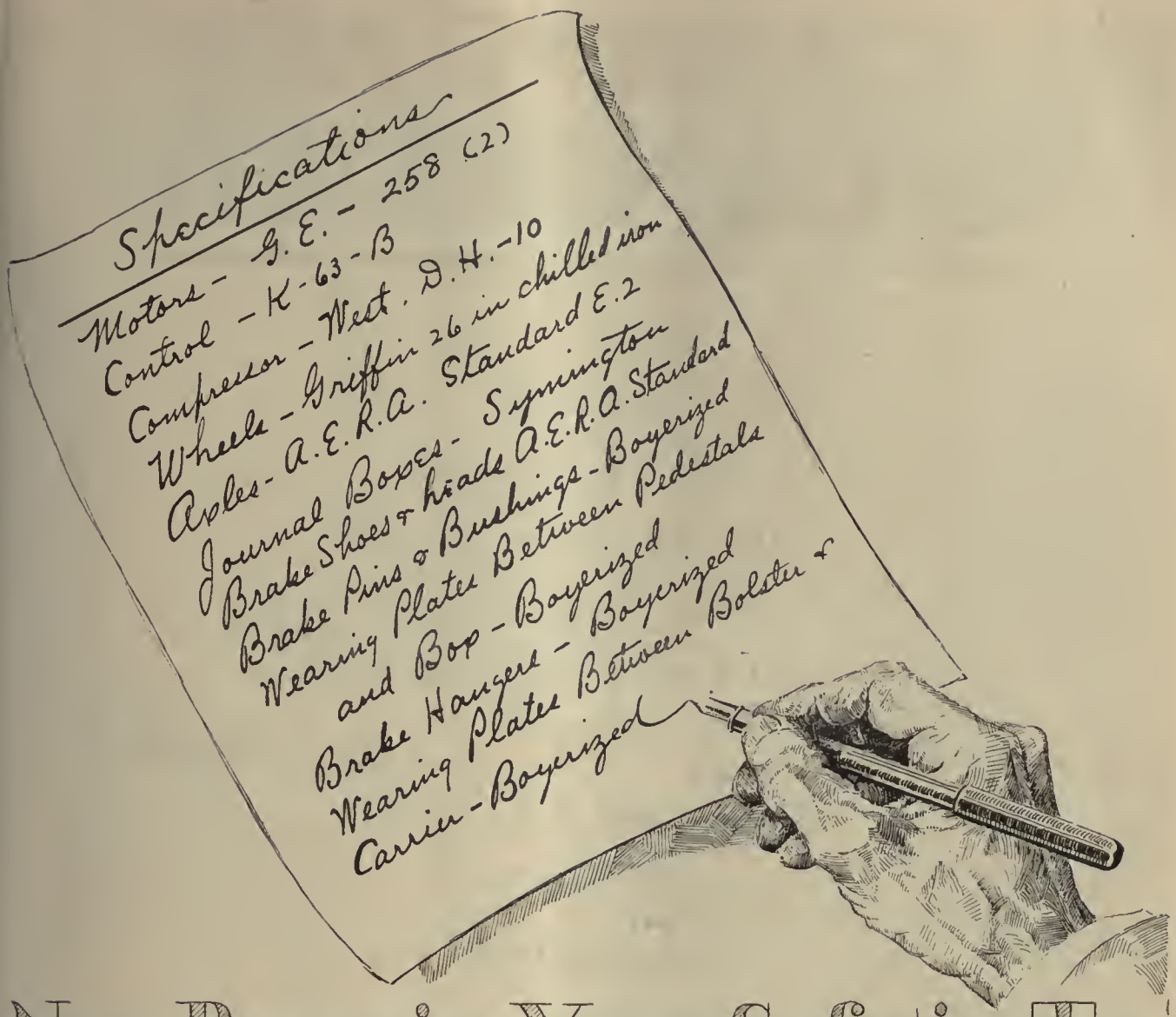
Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

SALES REPRESENTATIVES:

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W. M. McClintock, St. Paul, Minn.
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Now Boyerize Your Safeties Too

There's hardly an electric railway that hasn't had the most favorable experience of the superiority of Boyerized Brake Pins and Bushings on its big cars, whether in high-speed interurban or frequent-braking city service.

Now the fact that safety cars are ordered completely assembled doesn't mean that the car-builder won't give you what you have found to be the best and safest.

It's merely up to **you** to say that you want Boyerized Pins and Bushings to be standard on your standard cars and he will see that you get them for the trifling extra cost that will repay you many times over in braking safety insurance. And that fact applies to all Boyerized long-life specialties.

To **Boyerize** means to lengthen the life of your equipment and to lower the cost of your upkeep.

OTHER BOYERIZED SPECIALTIES ARE:

Boyerized Brake Hangers

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Boyerized Wearing Plates between the Pedestal Straps and the Journal Box

Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

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Steel Tires

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"The 'Standard' Brand on your material is an assurance of eventual economy."



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S.CAROLINA
N.CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
DOMINION OF CANADA
NOVA SCOTIA
49
The map above shows the location of the 49 foundries in the United States and Canada represented by the Association of Manufacturers of Chilled Car Wheels.
Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City. Ind.
Louisville.
Mt. Vernon Ill.
Ft Wayne. Ind
Birmingham
Atlanta
Savannah
Boston
Detroit
St. Paul.
Kansas City. Kan
Denver
Tacoma
Los Angeles
Rochester N.Y.
Sayre. Pa.
Lime Rock. Conn
Albany.
Toronto.
New Glasgow N.S.
Madison. Ill
Berwick Pa
Huntingdon. W.Va.
Wilmington. Del
Houston Tex
Hannibal Mo
Reading Pa
Baltimore
Richmond Va.
Ft William Ont
St Thomas
Hamilton
Ramapo. N.Y.
Marshall. Tex
Capacity
20,000
CHILLED
IRON WHEELS
Per Day
25 Million in Service
Association of Manufacturers
of Chilled Car Wheels
1229 McCormick Bldg. Chicago.



The ERICO

Portable Railbonding Apparatus

These two men are averaging 120 bonds per day with the Portable Erico. One does the preliminary grinding and cleaning—the other the welding.

For speed and ease of operation you'll find the Erico logical equipment for either straight away work or for pick-up jobs along the line.

Write today for complete data and illustrated bulletin.

The Electric Railway Improvement Co.
Cleveland, Ohio



Westinghouse Krantz Safety Control Panels

Safety Panels For Safety Cars

Each panel is placed above the vestibule window within easy reach of the motorman, and carries six switches mounted in separate compartments, controlling respectively the car lights, the compressor, the heater, the headlights, the buzzer and the register. N. E. C. fuse connections for each switch are also mounted in individual compartments, which can be opened only when the switch is "off," and all reachable parts are dead.

It is impossible for the motorman to touch live parts when operating the switch.



Krantz Safety Control Panel as Installed

The dimensions of the control panel are:

Length ..... 30½ inches
Width ..... 10 inches
Depth ..... 4½ inches
The weight is 55 lbs.

Westinghouse Electric & Manufacturing Co.
Krantz Works
160 Seventh St., Brooklyn, N. Y.

OKONITE

TRADE MARK
REG. U. S. PATENT OFFICE.

VARNISHED CAMBRIC
Wires and Cables

are made with the same care and high regard for quality which distinguishes the production of Okonite rubber insulation.

We are prepared to handle any high grade proposition, and solicit your inquiries.

"Manson" Tape (Friction) **"Okonite" Tape (Splicing Compound)**

THE OKONITE COMPANY, Passaic, New Jersey

Incorporated 1884

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Petlingell-Andrews Co., Boston, Mass.






You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.



The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.



May We Send Our Catalog?

TRADE MACALLEN MARK.

The Macallen Company

Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK.

Where every Working minute means money, blown fuses cut profits unless electrical circuits are protected by

ECONOMY *renewable* FUSES



INDUSTRIES using electrical energy operate most efficiently when delays in machine operation are unnecessary while blown fuses are being replaced.

Economy Fuses are used by thousands of industries because they permit of renewal in minimum time at minimum cost.

Where greater efficiency is required a reserve stock of fuses is kept on hand and used in case of blowouts. The blown fuse is then restored to duty at leisure by simply inserting a new Economy "Drop Out" Renewal Link.

Economy Fuses cut annual fuse maintenance costs 80% as compared to the use of "one-time" fuses.

The fibre cartridge, the winged washers which lock the fuse, and the threaded end caps which complete the assembly are virtually indestructible and are used over and over again.

Economy was the first line using inexpensive bare renewal links for restoring blown fuses to their original efficiency to be *Approved In All Capacities* by the Underwriters' Laboratories.

For sale by all leading electrical jobbers and dealers

Economy Fuse & Mfg. Co.
Chicago - U. S. A.

Economy Fusea are also made in Canada at Montreal.

500 Miles of Good Investment

500 miles of the surface lines of Chicago are placed on a slag base of some kind—150 miles have been placed on slag concrete within the last ten years. Steel cross ties have been used extensively resulting in the most permanent and repair-free track that can be made. Hundreds of openings made in streets of all ages show no sign of corrosion on steel ties or rails in contact.

When Blast Furnace Slag is used as an aggregate in concrete the cement enters the pores of the slag—does not merely adhere to the surface as is the case with gravel—resulting in a solid homogeneous mass of which the slag is an integral part—it cannot be freed.

For full information on modern track, write to this company. Our engineers will be glad to assist you in your track problems.

Carnegie Steel Company
General Offices: Carnegie Building, Pittsburgh, Pa.

1381



Signals of Safety for Safety Car Routes

With the high speed schedules and close headway of the safety car, it is imperative that you use Signals.

The signal best suited to your requirements is the one that is big, reliable and clearly discernible day and night. One so installed that the first car to reach the cut in contactor will have the right of way.

Those signals are U. S. Electric Signals, that prevent instead of cure.

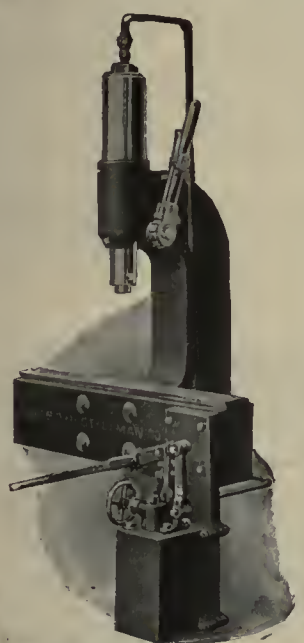
United States Electric Signal Company, West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Service Supply Company, Salford, Eng.

Any Shop Could Make Good Use

of these

HYDRAULIC TOOLS



Hydraulic Straightening Press for straightening bars, trolley poles, shafts, etc.

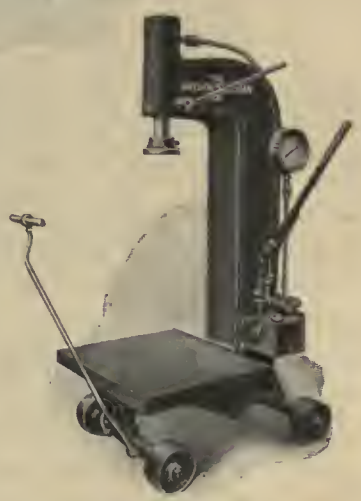
for straightening, bending, force fitting and for doing hundreds of odd pressing jobs so common in all shops.

The shaft straightening press illustrated has a capacity of 60 tons. For work requiring close attention it may be placed on a bench at suitable height. The ram is quickly brought to and from its work by means of the latch lever shown, and the pump, which is independent, may be placed wherever desired.

This is a convenient form of portable forcing press. It has a capacity of 35 tons. The pump is mounted in a convenient position near the floor to enable the operator to hold or guide the work while pumping. The ram is rapidly moved up and down by turning the lever in the pinion, which meshes with a rack in the ram. The pump is used only when the ram is resting on the work.

We build other presses for broaching, bending, shearing, pressing, valves, accumulators, pumps, jacks, etc.

Write for Catalogs.



Portable Hydraulic Press for forcing Bushings, Gears, etc.

The Watson-Stillman Co.
46 Church Street, New York
Chicago, McCormick Bldg.

415

SPEED

Speed
means Service
and
Service
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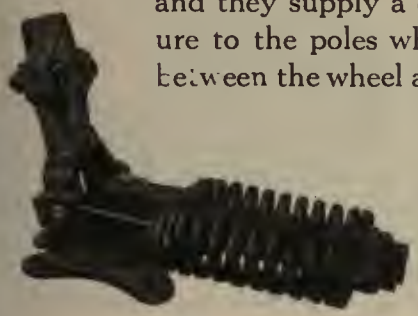
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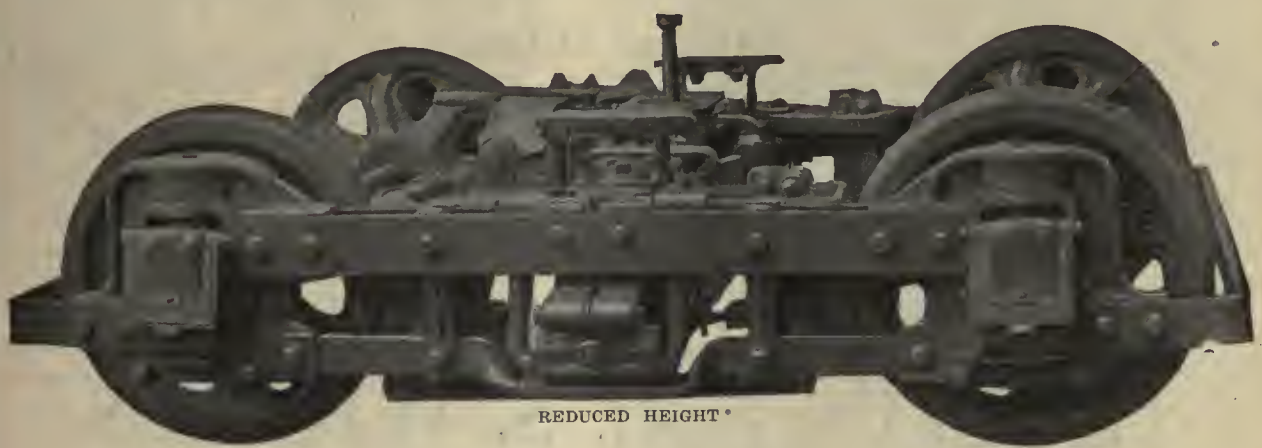
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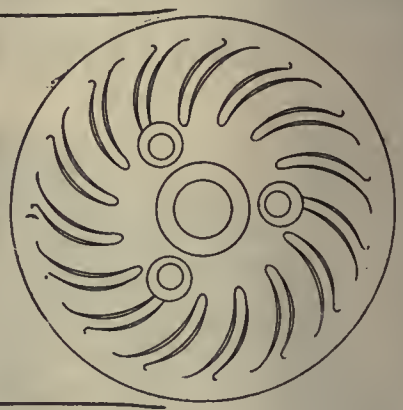
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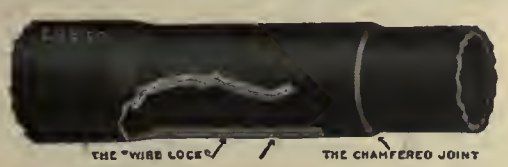
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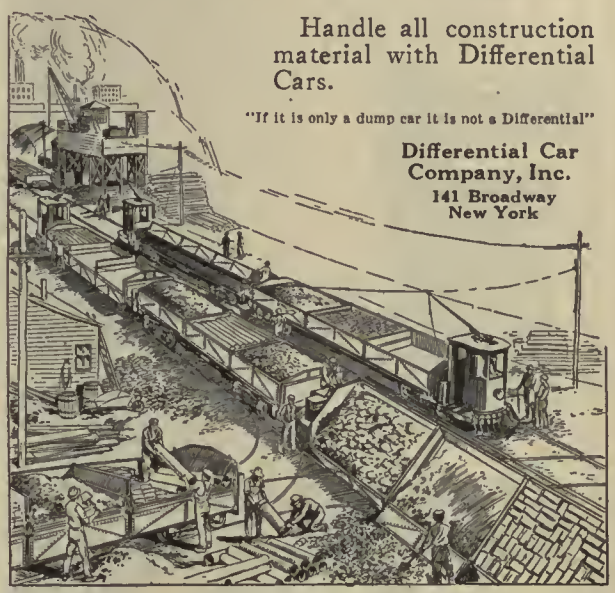
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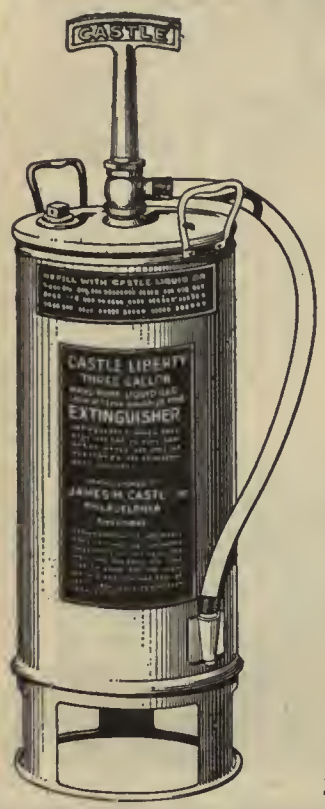
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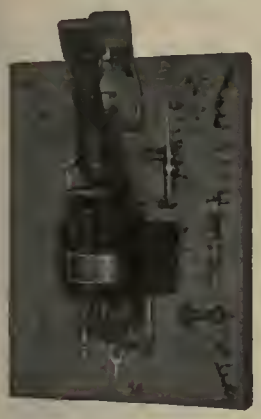


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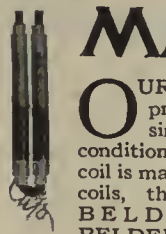
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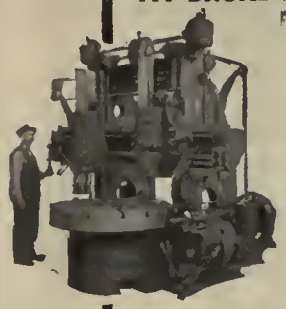
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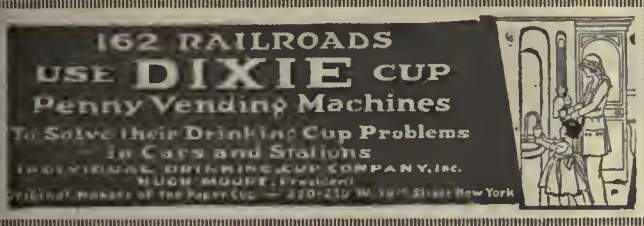
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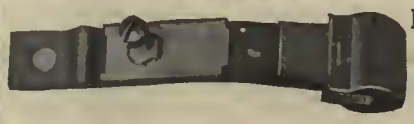
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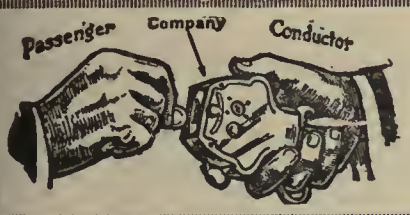
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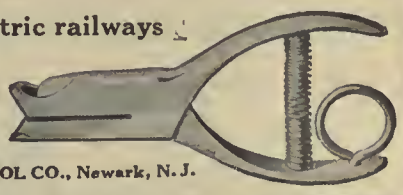
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PEREY TURNSTILES or PASSIMETERS
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require the most reliable equipment.

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The Earll No. 10 Catcher meets all requirements. It is light and strong and handsome—and 100% effective.



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Tool Steel Gears and Pinions, Anderson Slack Adjusters, Genesco Paint Oils, Clapp's Fire Resisting Paint, Dunham Hopper Door Device, Feasible Drop Brake Staffs, Anglo-American Varnishes, Paints, Enamels, Surfaces, Shop Cleaner, Johnson Fare Boxes, Drew Line Material and Railway Specialties, Perry Side Bearings, Miller Trolley Shoes, Hartman Centering Center Plates, Economy Power Saving Meters, H. and W. Electric Heaters, Garland Ventilators, Pilt Sanders, National Safety Car Equipment Co.'s One-Man Safety Cars.

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for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA







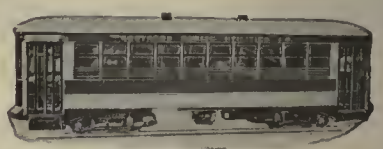


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Manufacturer of Cars and Car Materials

Cars of all types from one-man to large interurban

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



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Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws.
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Bound Brook Trolley Wheel Bushings Give Longer and Better Service

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POSITIONS VACANT

CHIEF clerk, experienced in street railway and electric light accounting. Gross business about $300,000, and 2500 customers. Give age, experience, salary expected and reference. P-642, Elec. Ry. Journal.

ELECTRIC repairmen and terminal inspectors wanted for 100 mile interurban line in California. Must be familiar with overhauling and repairing West H. L. control. Give experience and salary expected in first letter. San Francisco-Sacramento Railroad, Oakland, California.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West. State experience, references, and salary desired when replying. P-605, Elec Ry. Journal, Old Colony Bldg., Chicago.

FIRST CLASS armature winder wanted; location, Massachusetts. P-673, Elec. Ry. Journ.

FIRST-CLASS master mechanic wanted to take charge of car repair department in a car house near Boston, Mass., operating 75 closed cars. Please state experience 30 regular cars, having a total of about and wages expected. P-689, Elec. Ry. Journ.

FOREMAN wanted, for car house handling inspection and running repairs on 20 suburban and 25 city cars. P-685, Elec. Ry. Journ., Leader News Bldg., Cleveland.

MASTER mechanic for New England road operating 65 cars. Must be able to show results. State experience, age, previous responsibility and salary expected. P-693, Elec. Ry. Journal.

PERMANENT position for an experienced track Supervisor on one of the large trolley systems in the East. Must be capable of handling 18 to 20 track, bonding, welding and paving gangs. Only men thoroughly familiar with trolley track construction and maintenance will be considered. State age, giving experience in detail, salary expected and references. P-682, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

Mechanical and Electrical Engineer Wanted

Expert on power house and distribution system for street railway.

Mobile Light and Railroad Company
Mobile, Alabama

POSITIONS VACANT

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TIME table maker assistant, able, ambitious, experienced. State qualifications, experience and salary expected. Chicago Surface Lines, 804 Borland Bldg., Chicago.

POSITIONS WANTED

ARMATURE winder or controller man desires position; four years' experience in railway work. PW-680, Elec. Ry. Journ., Real Estate Trust Bldg., Phila.

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

EFFICIENT operating executive, age 38; now manager of a small property, desires change to a broader field; thoroughly experienced in city and interurban, both freight and passenger service; available within 60 days from date of acceptance; prefer South or Southwest. Address, Box I, Goldsboro, N. C.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

MASTER mechanic, 17 years' experience in all departments, city and interurban, M. K. and H. L. control; can handle labor and show results; A-1 reference furnished. PW-690, Elec. Ry. Journ., Leader-News Bldg., Cleveland.

ROADMASTER, nineteen years on trolley roads. Can handle any track proposition. Now employed as roadmaster. References good. PW-691, Elec. Ry. Journal.

SUPERINTENDENT, 17 years' experience in transportation, traffic and mechanical, on road operating in eastern Ohio. A-1 references, executive ability, competent to assume full charge; can get results. Address PW-639, Elec. Ry. Journal, Cleveland.

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POSITIONS WANTED

THOROUGHLY competent operating executive, now manager of small property, desires an opportunity to assume greater responsibilities, with better prospects for the future. Fully qualified in all departments. Most excellent references from present and past employers. Correspondence solicited. PW-637, Elec. Ry. Journal.

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Experienced traveling salesman desires to connect with electrical fixture manufactures or supply house. Will travel Jersey and Pennsylvania on commission basis. State proposition. S. Gilber, 449 Hendrix Street, Brooklyn, N. Y.

Electrical Supplies Salesman Available

Salesman, ten years' road experience, street railway and electrical supplies; Middle West preferred. AS-688, Elec. Ry. Journ., Old Colony Bldg., Chicago.

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Complete set of Electric Railway Journals for 1917 wanted. Newport News & Hampton Ry., Gas & Elec. Co., Hampton, Va.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

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—AT A BARGAIN

Will keep count and curve drawing sheet record on 20 producing machines. Operates on 20-v. D.C. service.

Original cost $600. First-class shape. Various spare parts included.

W. A. HEFNER

c/o McGraw-Hill Co., 10th Ave. at 36th St., New York City.

Keep your eye on the Searchlight and your advertisements in it.

ATTENTION

Having just purchased from the United States Government, can offer you the following track material at very exceptional prices:

75,000 Tie Plates, 6½ x 10, for 80-lb. rail.
150,000 Pieces of Rail Braces for same type rail.
25,000 Pair Angle Bars, 80-lb. rail drilling 6 x 6 x 6.

The above material located at Norfolk, Va.; Kearny, N. J., and Chicago, Ill. A new, first quality steel, ready for immediate shipment.

Also large tonnage of steel rails of most all sections.

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Frick Bldg., Pittsburgh, Pa.



Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

Caution—RAIL USERS

BUY NOW. There is a SCARCITY. We offer the following NEW RAILS for prompt shipment:

New 12-lb. and 30-lb. rails, splices, bolts and nuts.
New 90-lb. rails, angle bars, bolts, nuts and spikes.

They will be gone soon. Write or wire for our quotations.

Wire—300,000 lb. or more of copper trolley, feeder, high tension, etc.

A number of steel bridges on line of Cincinnati & Columbus Traction Co. For quick acceptance at $1.00 per 100 lb. as is. Photographs on request.

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New			Relay		
2000	tons	100's	350	tons	100's
1800	tons	90's	400	tons	85's
700	tons	85's	300	tons	75's
430	tons	80's	1200	tons	70's
200	tons	75's	800	tons	65's
240	tons	70's	1500	tons	60's
85	tons	65's	4000	tons	56's
500	tons	60's	1100	tons	50's
100	tons	40's	200	tons	45's
20	tons	30's	2000	tons	40's
100	tons	24's	650	tons	35's
330	tons	20's	430	tons	30's
150	tons	16's	230	tons	25's
120	tons	12's	340	tons	20's
17	tons	8's			

10 tons, 7 inch, 70 lb., Shanghai.
110 tons, 9 inch, 90 lb., Grooved Girder.

Good Stock *Prompt Shipment*

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Get our new hlg 52-page bulletin No. 280 for exceptional offering in Cars, Locomotives, new and used Switch Material, Angle Bars, Tie Plates, Rail Braces, Pipe, Piling, Tanks, Engines, Generators, Boilers, Machine Tools, etc.

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2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380-volts.
1—250-kw., 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380 volts.

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20—G.E. 800-volts with Form K Controllers.

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34—New Wasson Trolley Bases, Model 1 S. R. Immediate delivery.

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New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work.

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3—50 foot.

Center Entrance Steel Interurban Cars

Standard C 55 P Trucks
4 Westinghouse 306 CA Motors
H L Control and

7—43 foot.

Single End Wood Interurban Cars

Brill 27 E Trucks
4 G.E. 57 Motors
K Control

Immediate Shipment

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the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

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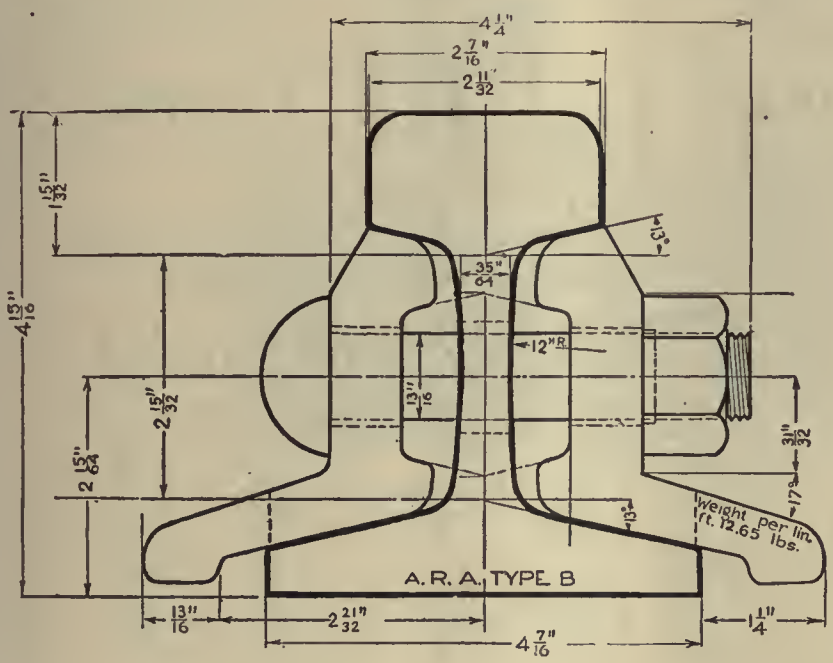
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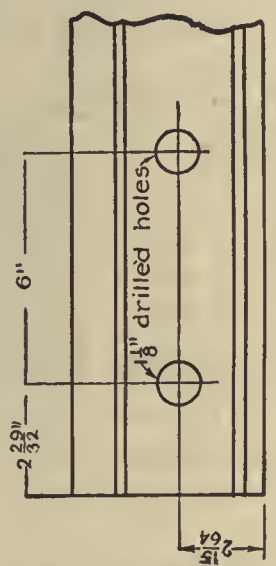
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A.R.A. "TYPE B" RAIL

Approximately 50,000 gross tons—drilled—standard lengths

Stored at Norfolk, Va. and Kearney, N. J.





Note actual dimensions of rail stated hereon.

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1324-1326 Woolworth Building

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1312 First National Bank Building

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2115 Railway Exchange Building

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IMMEDIATE SHIPMENT

GUARANTEED

10,000 Tons New 12-lb. to 100-lb., and fastenings.
40,000 Tons New Open-hearth, first quality, 80 lb.
5,000 Tons Relayers, 25 to 100 lb., and fastenings.
Car and less carload inquiries and orders solicited.
Rails cut to lengths for all purposes.

TRACK ACCESSORIES
BOLTS, NUTS AND SPIKES

We Manufacture

FROGS, SWITCHES, CROSSINGS, PORTABLE TRACK, DUMP CARS, PLATFORM CARS, ETC.

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Park Building, Pittsburgh, Pa. — Tribune Building, 154 Nassau St., New York, N. Y.

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

FREQUENCY CHANGER SETS

1—600 kva., Allis-Chalmers Frequency Changer Set, 300 r.p.m., 3-phase, 60-cycle, 2300-v. one end, 3-phase, 6600-v., 25-cycle on other end.
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Complete

Mounted on Standard C-60-P Trucks; 4 West. No. 56 Motors.

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Philadelphia, Pa.

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TWO BELL LOCOMOTIVES
7 - TON - OIL BURNING



First-Class Condition — Immediate Delivery
Full Specifications on Request

ENGEL & HEVENOR
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FOR SALE—*IMMEDIATE DELIVERY*

TRANSFORMERS

Used for a short time at Camp Stuart, Newport News, Va., are in excellent condition and will be furnished with hangers.

WESTINGHOUSE "TYPE P"

Kva.	HT.	Lt.	Cycle
1	2200	110-220	50-140
5	2200	110-220	60
7½	2200	110-220	50-140
10	2200	110-220	60
15	2200	110-220	60

PITTSBURGH

2	2200	110-220	60
5	2200	110-220	50-133
15	2200	110-220	50-133
15	2200	110-220	60
20	2200	110-220	60
25	2200	110-220	60
375	22,000-11,000	2300	60
400	22,000-11,000	2300	60

"GEN. ELEG." CONSTANT CUR. Type "RO"

			Amp.
4	2300	60	6.6
8	2300	60	6.6

"PACKARD" TYPE "A"
3-k., 60-Cycle, P.V. 3300, Amp. 6.6.
Transformer, 1674 Adjuster Coil, A.W., 1674

15	3300	115-230	60
100	2200	110-220	60

"GENERAL ELECTRIC" TYPE "H"

Kva.	Ht.	Lt.	Cycle
5	2200	110-220	60
7½	2200	110-220	60
10	2200	110-220	60
15	2200	110-220	60
20	2200	110-220	60
25	2200	110-220	60
2	3300	122-244	60
7½	3300	122-244	60
10	3300	122-244	60
10	1560-3120	115-230	60
15	3300	122-244	60
25	3300	122-244	60
30	3300	122-244	60
37½	1560-3120	115-230	60

"MOLONEY" TYPE "HE"

2	3300	110-220	60
7½	3300	110-220	60
7½	1150-2300	115-230	60
15	1150-2200	110-220	60
15	1150-2300	115-230	60
15	1650-3300	115-230	60
15	1650-3300	120-240	60
20	4000	110-220	60

"WAGNER" TYPE "HE"

15	2200	110-220	60

Also the Following ELECTRICAL MATERIALS in Large Quantities

Adjusters	Brace Arms	Cutter Boxes	Clamps	Cutouts	Switches
Arresters	Brackets	Condulets	Fixtures	Plugs	Wire
Break Arms	Bolts	Lamp Cord	Insulators	Sockets	Poles
Bases	Cross Arms	Cleats	Lamps		

Write for detailed list and prices

ATLANTIC SALVAGE CO., Newport News, Va.

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2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.
Get Our List and Prices.

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WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc Remember our initials stand for our product.

CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.

EST. 1895 — 4732-4-6 ST. CLAIR AVE., CLEVELAND — INC. 1918

FOR SALE—IMMEDIATE DELIVERY

For further particulars Wire, Phone or Write



CAR SPECIFICATION No. 240—3 Double Truck Interurban All-Steel Center Entrance Cars

CAR BODY

Length over all	50-ft.- 6-in.
Width over all	8-ft.-9½-in.
Height Rail to Trolley Board	12-ft.- 3-in.
Length Body	49-ft.
Height Body	8-ft.-8½-in.
Roof	Arch
Headlining	Agasote
Interior Trim	Natural Cherry
Doors	Sliding (Electro Pneumatic Operation)
Steps	Folding
Ventilators	10 Railway Utility
Seats	Hale & Kilburn Rattan
Seating Capacity	64
Headlights	Golden Glow
Signal System	Consolidated
Heaters—Electric Consolidated Type—Thermostatic Control	
Interior Lighting	20 over seats
Window Fixtures	Edwards
Sanders	(Air) Ohio Brass Co.
Curtains	Pantasote
Hedley Anti-Climbers	

TRUCKS

Type	Standard C. P. 55
Gauge	4-ft.-8½-in.
Wheel Base	6-ft.- 1-in.
Axles	A. E. R.A. Standard E.B.
Journals	4½-ft.- 8-in.
Wheels—Cast Steel, Diameter	33-in.
Tread	3½-in.
Flange	¾-in. x 1-in.
Truck Centers	28-ft.

Brakes—Westinghouse Semi Auto Air D1F Compressor.
12 x 12 Brake Cylinder. Westinghouse Slack Adjuster.

ELECTRICAL EQUIPMENT

Quadruple Equipment Westinghouse 306 C.A.
Bronze Armature and Axle Bearings, B.P. Gears and Pinions, Ratio 20-64.
Control Westinghouse H.L. Double end operation.
Approximate Weight Complete—57,800 lbs.
These cars are in splendid pre-used condition and may be inspected under full load conditions.



CAR SPECIFICATION No. 241—7 Double Truck Interurban Cars

CAR BODY

Length over all	42-ft.- 9-in.
Width over all	8-ft.- 3-in.
Height Rail to Trolley Board	12-ft.- 6-in.
Length of Body	32-ft.- 3-in.
Height of Body	8-ft.- 5-in.
Roof	Monitor Deck
Headlights	Golden Glow
Heaters	Electric
Seating Capacity	52
Seats	Winner (Pantasote)
Curtains	Pantasote
Sanders	1-Hand Type

TRUCKS

TYPE—Brill 27 E 1.	
Wheel Base	6-ft.
Wheels—Steel, Diameter	33-in.
Tread	3½-in.
Flange	¾-in. high, 1-in. wide
Axles	4¼-in.
Journals	3¼-in. x 7-in.
Gauge	4-ft.-8½-in.
Truck Centers	22-ft.- 1-in.
Brakes—Westinghouse—Straight Air. Peacock—Hand.	

ELECTRICAL EQUIPMENT

Quadruple—G. E. 57. Gear Ratio—2461. Control—K 14 B.
Approximate Weight Complete—49,000 lbs.

CAR SPECIFICATION No. 244—3 New All-Steel Cars

CAR BODY

Extreme length	33-ft.
Extreme width	8-ft.- 3-in.
Height	10-ft.
Seating capacity	42
Mechanically operated doors.	Automatic ventilators.
Consolidated electric heaters.	15-in. step.
Hunter signs.	Westinghouse air-brakes.

TRUCKS

Type—Radial. Wheels 28 in. diam.
Maximum traction trucks.

ELECTRICAL EQUIPMENT

Consists of two Westinghouse, 532-A Motors and two K-36-J controllers.

RAILWAY MOTORS

30—WEST.	50-F	150-hp. Ry. Motors
4 G E	51	81-hp. Ry. Motors
6—WEST.	76	75-hp. Ry. Motors
12—WEST.	112	75-hp. Ry. Motors
10—G. E.	57-3-T	50-hp. Ry. Motors
8—G. E.	88-C	40-hp. Ry. Motors
8—WEST.	101-B-2	40-hp. Ry. Motors
50—WEST.	49	35-hp. Ry. Motors

All of the motors are complete with gears, pinions, gear cases and axle bearings.

Have also various assortments of spare railway armatures for immediate delivery.

We Advertise and Sell Your Released Equipment without cost to you. Equipment Bought, Sold and Exchanged

THEO. MALM & CO.

ENGINEERS and BROKERS

New and Pre-Used Railway and Power Equipment

507 FIFTH AVENUE, NEW YORK CITY **Telephone: Murray Hill 4520-4521**

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers
Ingersoll-Rand Co.

Air Aftercoolers
Ingersoll-Rand Co.

Ammeters
Weston Elec'l Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Angle Bars
Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobile and Buses
Brill Co., The J. G.
White Co., The

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
More-Jones B. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

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Columbia M. W. & M. I. Co.
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Bond Testers
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Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

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Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

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Brackets and Cross Arms, (See also Poles, Ties, Posts, Etc.)
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Creaghead Eng. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
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Ohio Brass Co.

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National Railway Appliance Co.
Westinghouse Traction Brake Co.

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Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

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Brill Co., The J. G.
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National Brake Co.
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St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Traction Brake Co.

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Green Engineering Co.

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General Electric Co.
Jeandron, W. J.
United States Graphite Co.
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United States Graphite Co.

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Blaw-Knox Co.

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Bemis Car Truck Co.

Bushings, Graphite & Wooden
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Differential Car Co.

Cars, Passenger, Freight, Express, etc.
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Kuhlman Car Co., G. C.
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Thomas, Percy A.
Wason Mfg. Co.

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Electric Equipment Co.

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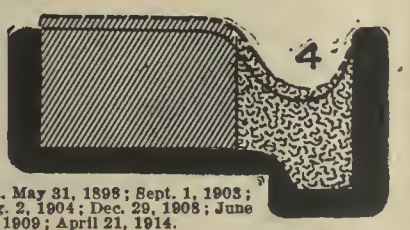
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WHAT AND WHERE TO BUY

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Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
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Columbia M. W. & M. I. Co.
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Electric Service Supplies Co.

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Westinghouse Elec. & Mfg. Co.

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Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

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Brill Co., The J. G.
Hale & Kilburn Corp.
Peters & Co., G. D.
St. Louis Car Co.

Second-Hand Equipment
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Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters. (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

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Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

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Frankel Connector Co.

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American Steel & Wire Co.

Splicing Compounds
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Brill Co., The J. G.
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Taylor Electric Truck Co.

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McGuire-Cummings Mfg. Co.
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Irving Iron Works
Universal Safety Tread Co.

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Steps, Safety
Irving Iron Wks.

Stokers, Mechanical
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Strand
Copper Clad Steel Co.
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Structural Steel
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Irving Iron Wks.

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Switch Stands
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Ramapo Iron Works

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Wharton, Jr. & Co., Inc., Wm.

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Mr. Hurley said:

"When I was Chairman of the Federal Trade Commission, I made it a point to have the principal trade papers in the United States sent to me regularly. These were read not only by myself, but by the entire staff, so that we might have a finger on the pulse of the country's industry.

"Advertising agencies placing national and international advertising could well insist on every man in their employ reading the trade journals of the industries of their clients so that they may keep themselves currently informed on the conditions in the businesses for which they are writing copy.

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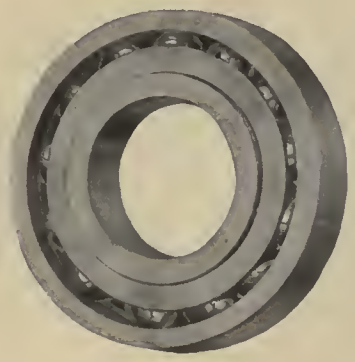
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GURNEY

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10 Ft. Air Compressor

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More than 70 electric railway companies in such cities as Kansas City, Mo., Terre Haute, Ind., Bridgeport, Conn., Madison, Wis., and Richmond, Va., are operating safety cars equipped with General Electric CP-25 (10 cu. ft.) air compressors.

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ELECTRIC RAILWAY JOURNAL



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Lest We Forget

Think of the terrific cost, and breakdown of service, last winter, due to inadequate maintenance and snow-fighting equipment, and order equipment and repair parts *NOW*.

Knowing the conditions confronting manufacturers—labor, material and transportation, deliveries are apt to be long.

Ask yourself, What plans have I made to solve the problem as far as possible next winter?

Have I placed the orders for adequate snow-fighting equipment?

Have I checked up storeroom supplies and placed orders for delivery next Fall and Winter?

Have I ordered dipping and baking ovens, so as to give all armatures and field coils a "rain coat" of moisture repelling varnish, which will materially help to keep them from failing next winter?

Have I computed the terrific cost of failures last winter, and decided how much I would save by preparation and planning?

Have I studied schedules and planned to have special snow schedules which will give motors sufficient lay over at terminals, during snow storms, to cool off before making return trip?

Have I arranged to fit all cars with suitable splash guards to prevent, so far as possible, snow and slush lodging on resistance grids, motors, wiring and other parts, as well as with suitable covers for motors?

Have I studied the cost of operating old motors that are worn out, and found that it would represent a handsome return on the investment to re-equip such cars with modern Westinghouse motors?

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

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Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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Symposium of Special Contributed Articles

This series is intended to encourage a "get-together" spirit on the part of all factors concerned in improved electric railway service

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"BUNGALOW" Air Compressors are especially suited to the low, light-weight "Safety" Car

Familiar Type of "Bungalow" Air Compressor



More than 2,287 "Safety" cars, now running on 109 different electric lines throughout the United States, are equipped with "Bungalow" air compressors

Westinghouse Traction Brake Co.

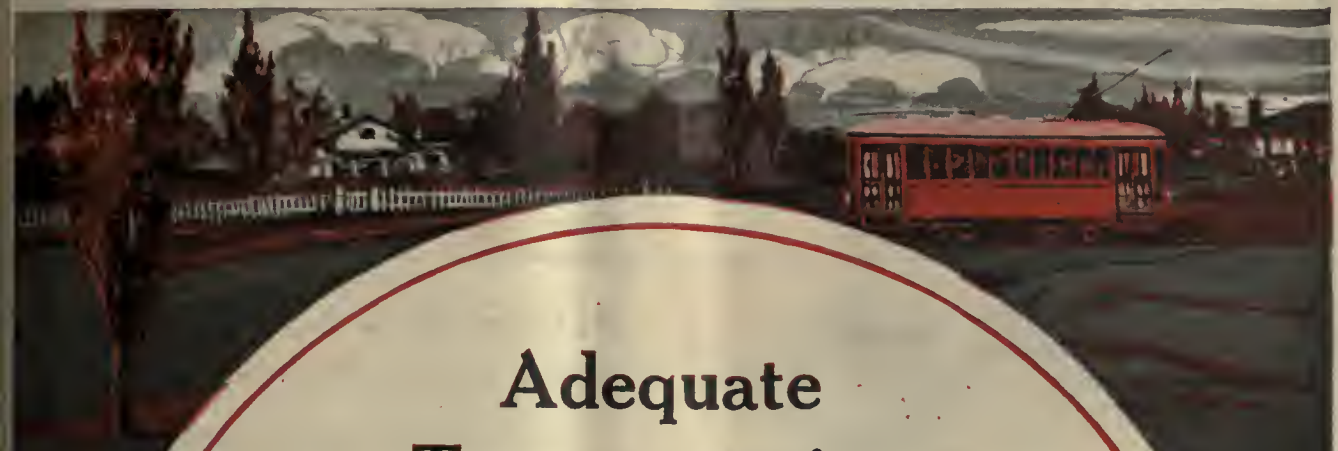
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Wilmerding, Pa.

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Typical "Safety" Car



Adequate Transportation

—*A Public Necessity*

To accomplish this a closer bond of understanding between the electric railway companies and the public is essential.

Excerpts from the Electric Railway Journal's Annual Statistical Number are given in the following pages.

These observations from this leading journal should be helpful to the electric railway industry—as an inspiration to the industry and education to the public.

A wide circulation of these facts should give the public a clearer insight into the industry's problems and develop a more cordial spirit toward their solution.

WESTINGHOUSE ELECTRIC

Westinghouse



More Cars—Less Track

To give better service, with diminishir finances, electric railways are operating mo safety cars, though forced to stop trac extensions.

Statistics Show

—twice as many cars were built in 1919 as in the year previous.

—only five companies in the United States built more than 4 miles of new track during 1919. This includes turnouts, sidings and connections.

Is the Franchise Fair?

Should paving, cleaning and sprinkling c streets be included in the cost of transporta tion?

—Public authorities apparently have failed, except in a few instances, to recognize the injustice of burdening the cost of transporta- tion with such charges as those for paving, cleaning and sprinkling of streets.

—Does the car rider pay for what he gets and get what he pays for?

Putting the System in Shape

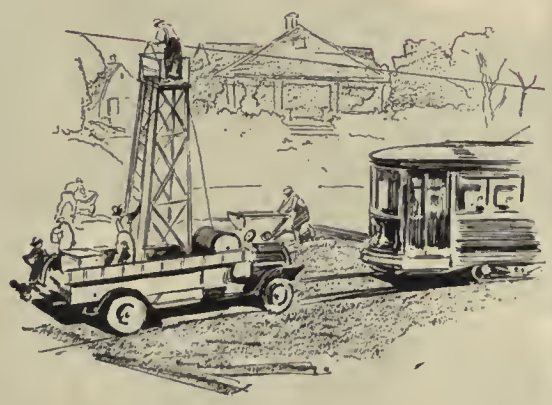
Catching up on deferred maintenance, and bettering upkeep conditions depend on suffi cient revenue.

Preceding the war net operating revenues had in many cases declined to such an extent tha maintenance of equipment, track and lines fell behind.

During the war, the combination of high prices, lack of money, and scarcity of materials and labor forced all but absolutely essentia maintenance to be deferred.

Since the armistice, excessive costs have permitted only limited maintenance.

Improvements depend on sufficient revenue



Westinghouse Elect

East Pittsbu

Realizing an Injustice

he true condition of the electric railway ıdustry is understood better today than ever.

.lectric railways have been hesitant about etitioning for increased fares, feeling that it as better not to start a controversy as long s the present rate of fare, coupled with xcellent traffic, was providing enough to eep the company solvent.

The rate of fare and cost of service are distinctly related

—and the public realizes the injustice of an inflexible selling price of a commodity whose cost varies with market conditions.



A Better Understanding

The present condition of the electric railway ndustry is due almost entirely to inability to ıdjust the price of the product to its cost.

This in turn is due to several unfortunate :onditions, largely outside of the control of the :ompanies.

1st—Rapidity of increases in costs of labor and materials.

2nd—Reluctance of patrons to permit higher fares.

3rd—Politics.

The dawn of the day of sufficient revenue with better service and better feeling on the part of the public appears. The public is beginning to realize its dependence upon the electric railway.

Summing Up the Evidence

More progress has been made in getting a proper attitude on the part of the public than is generally realized.

The Electric Railways have made greater efforts to meet the situation than the public appreciates.

The existence of the railway system and the continuation of the service require a close bond of understanding between company and public.

The story of service and the problem of the industry must be repeatedly told. Public interest demands it.

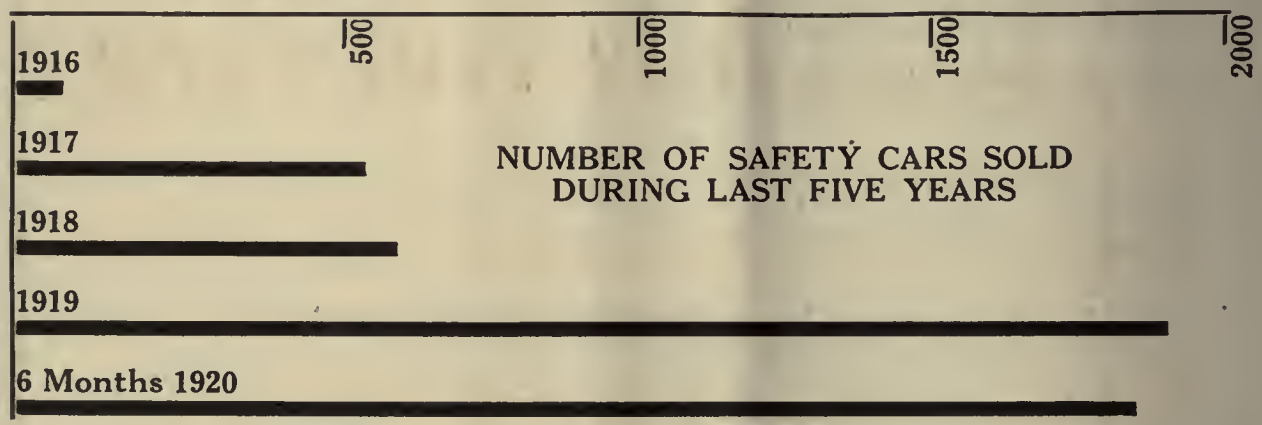
W
WESTINGHOUSE ELECTRIC



: Manufacturing Co.
nnsylvania

Our Faith in the Future of the Street Railway Industry Has Been More Than Justified

The Street Railway Companies' FAITH in the SAFETY CAR is contributing to the present DEVELOPMENT and GROWTH of the INDUSTRY.



One Reason Why Safety Car Sales Have Doubled Is Because Street Railway Companies Cannot Afford to Operate Without Safety Cars.

Street Railway Companies who did not order **Safety Cars** in **1918** or **1919** now complain of losses of hundreds of dollars per day, caused by their lack of Safety Cars in **1920.**

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., St. Louis, Mo.

CHICAGO
Railway Exchange Bldg.

WASHINGTON, D. C.
Munsey Bldg.

NEW YORK
City Investment Bldg.

PITTSBURGH
Westinghouse Bldg.

SAN FRANCISCO
Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.





IMPERIAL HEADLIGHTS FOR EVERY TYPE of CAR

Whether your cars operate on bright streets, through dim suburbs or on private right of way, there are Crouse-Hinds Imperial Headlights for them.

You can pick a type with just the right quantity and quality of illumination, and be sure that it will serve steadily, dependably.

Incandescents, Luminous Arcs and Carbon Arcs are included in the complete Crouse-Hinds Imperial Line.

The Ohio Brass Company
Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.







The "Break" Has Come!

Eight innings of air-tight ball. Not a man walked—one hit for each side—no errors—score, 0-0—anybody's game. You sit back to watch a pitchers' battle.

Then something happens. The home team comes to bat. First man up swings his bat for a second, listens to some "inside stuff" from the "old man," and prances eagerly up to the plate. Fans on the bleachers and the home team in the pit move forward together to the edges of their seats. Expressions change from casual interest to anticipation. The opposing pitcher looks a bit anxious and your coach back of the first base puts added pep into his antics and chatter.

What's happened? You know. The first ball pitched will be slammed out for a safe hit and from now on the game is sewed up for the home team.

The "break" has come!

The new "break" of optimism is especially strong in the electric railway track department, for the record number of

THERMIT INSERT RAIL WELDS

ordered and installed during the first six months of 1920 show how keenly the railways are appreciating the rail-life prolonging quality of these *non-cupping* joints.

Send for Pamphlet No. 1232



METAL & THERMIT CORPORATION
120 Broadway
Chicago San Francisco
Pittsburgh Toronto

SERVICE STRENGTH THERMIT WELDING ECONOMY



The Future of the Electric Railway Industry Is as Solid as a Steel Twin Tie Track

(We know no better expression of our faith)

Our faith in the future of the industry?

Why there never was a time it could be questioned—least of all now.

Problems?

Lots of them. But if we didn't have problems the industry would stand still. Necessity must come before inventions. Progress only follows problems.

The tide has turned. Operators are making extensions and betterments because they know it will pay. The public is more appreciative of good service. Traffic and revenues increase.

The electric railways are building for a strong future. They're using more and more Steel Twin Tie Track because they know they'll need its stability and carrying capacity years from now.

We're sold on the future of the industry and look forward to it with optimism and enthusiasm. Can you blame us when our sales for May 1920 equalled our total sales for 1919?

Yes the industry is up and doing. So are we. Get ready for the best years the electric railways have ever enjoyed. Build economically. Build permanently.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

16702 Waterloo Road CLEVELAND, O.

Steel Twin Tie Track

Study the Doughnut!

There Is No Nourishment in the Hole

WHAT influence have the years 1914 to 1920 exerted on the electric railway industry? Good or bad? How will we consider ten years from now the period from which we are just emerging?

Did they bring difficulties, problems, in some cases loss to the electric railway companies?

To be sure. Increased costs, fixed revenue, labor strife, war restrictions have been as thorns in the side of the industry. If taken alone the grief of these years would have discouraged the strongest men in the business.

But have there been compensating gains?

Yes, gains more than compensating. The big men of the industry kept their eyes on the light ahead, finding new courage and inspiration in the progress *actually* made in the business of running of electric railways.

During the past six years the industry has learned through adversity and necessity that its job is merchandising as well as manufacturing; that there are better ways of serving the public; that the public is appreciative of good service; that you can make money by saving it as well as by getting more; that labor has both a place in American industry and a responsibility equal to those of capital; above all, that our problems all admit of solution.

Witness the revenue increases due to stimulation of the riding habit; the safety car; the changing of the motor bus from a competitor to an auxiliary; the changed attitude of the public when and where real service is rendered; the number of properties that have kept out of the "red" by selling more and better rides; a more stabilized labor situation; a constantly improved condition of the industry as a whole.

Yes, ten years from now we shall have ceased to think of 1914 to 1920 as troublesome years for the industry. Instead they will go down in electric railway history as years of progress and achievement.

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

EXCLUSIVE AGENTS:

ATLAS RAILWAY SUPPLY CO. Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO. Pittsburgh, Pa.

CHAS. N. WOOD CO. Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc. 77A Queen Victoria St., E. C. London, England

Rotary or Reciprocating A Grinder for Every Need

Most electric railways have sole mass transportation rights in the communities which they serve.

So, it is assumed that they will get 100% of the business by simply maintaining a certain standard of service.

But 100% may mean 100 rides per inhabitant per year. Or it may mean 150 rides per inhabitant per year.

It is self-evident that the proportion of business for the utility cannot be increased.

However, experience—RECENT EXPERIENCE—teaches us that the riding habit—CAN be stimulated and the VOLUME of business considerably increased.

The safety car is doing it every day.

Yes, the MONOPOLY has something to sell.

Shorter headways—higher schedule speeds—car in sight—service—modern mass transportation.

Install modern equipment and methods, make your cars more attractive and efficient, and get that increment of business that counts so much.

KEYSTONE STEEL GEAR CASES

"Riveted for Strength—Welded to Hold the Rivets"

Made in standard forms for practically all modern types of railway motors.

By experience it has been found that a rivet is strong in one direction and a spot weld in exactly the opposite—against slipping.

To secure the strongest possible construction, Keystone cases are riveted and welded. Soft, open-hearth, deep-drawing sheet steel of extra quality is used in the construction of these cases and breakage or tearing out of the sides is unknown.

Brackets are either steel or malleable iron castings or steel forgings and the manufacturing processes and design of these cases insure maximum strength and service.

There is a lot more about them—write for data sheet.



ELECTRIC SERVICE SUPPLIES CO.

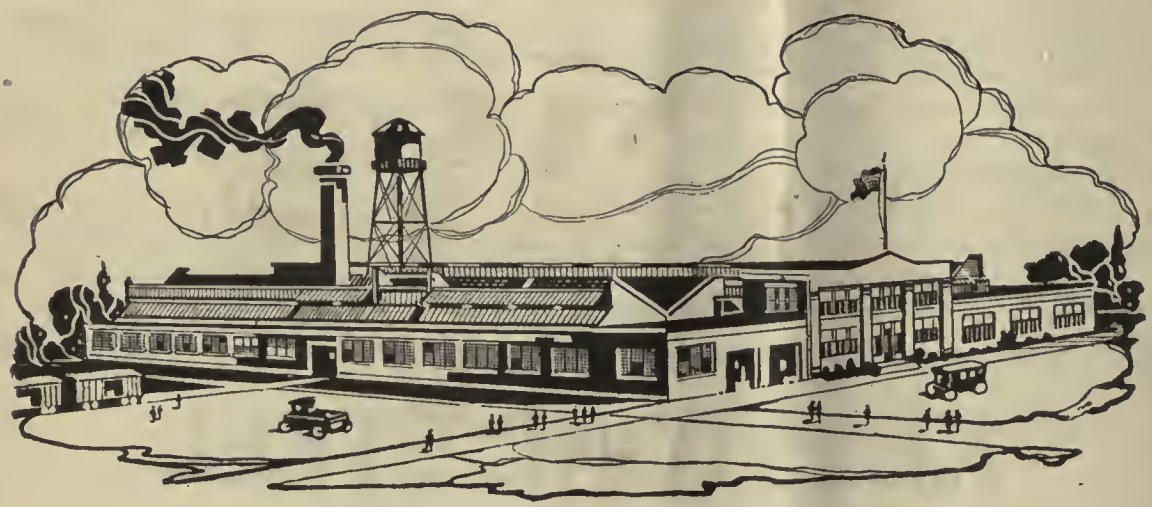
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg



WE ACT

"Actions," the old copy book maxim told us, "speak louder than words."

Had we lacked faith in the future of the electric railway industry, we would not have put up this magnificent building less than two years ago, when the condition of the electric railways was little short of desperate.

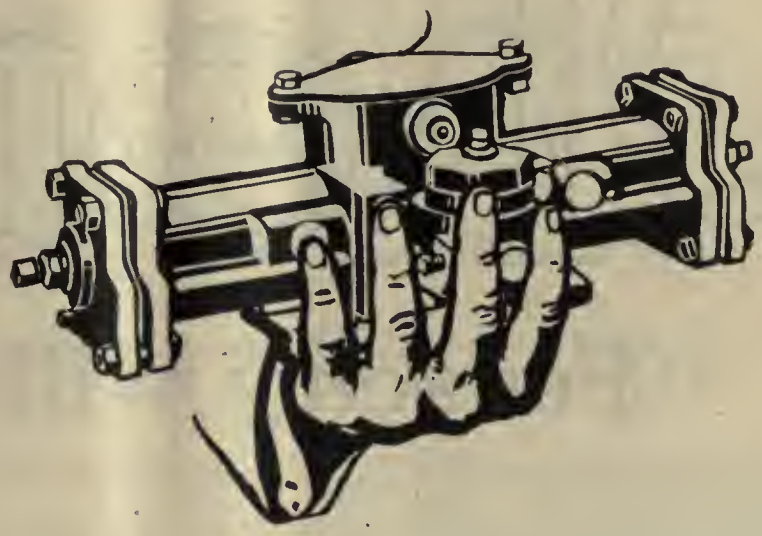
We had the faith; first, because we know that the electric railway is an essential industry; that unlike a luxury, it is not built upon changing whim and caprice, but upon a need for transportation that is going to endure as long as our present system of manufacture, business and pleasure *en masse* endures.

We had the faith; second, because in our long experi-

National Pneumatic Company, Inc.

50 Church Street, New York **Edison Bldg., Chicago**

Works: Rahway, N. J.



OUR FAITH

ence in this industry we have found that "never-say-die" spirit which has always been keen to find the way out to meet advancing costs—whether it was in adopting pay-enter and pay-leave fare collection, laborless, pneumatized safety cars or trains, the automatic substation, or, to go back to earlier days, alternating current and rotary converter distribution for direct current generation.

New days will bring new ways, but we have put down *our* stakes that the art of *popular transportation* will continue to develop ever growing usefulness, no matter what discouragements may temporarily impede its ability to carry the greatest number of people in the shortest possible time with the greatest possible comfort.

National Pneumatic Company, Inc.

50 Church Street, New York **Edison Bldg., Chicago**

Works: Rahway, N. J.

Phono

"Phono-Electric" "Phono-Electric"

Tenacity Will Win



When we look over the orders for Phono-Electric Trolley wire we don't see any evidence of that lugubrious idea that the electric railway is a has been.

For, if it is, why should so many engineers specify, and so many executives approve, the purchase of a product that will live 'way beyond the span ordinarily allotted to overhead materials?

Evidently, neither these engineers nor these executives nor any other public-spirited individuals have espied upon the transportation horizon any way of carrying comfortably more people at less cost (and *when* they want to be carried, rain or shine, early or late) than the way offered by the electric railway.

Bridgeport Brass Company
Bridgeport Connecticut

2232

Electric

Tenacity Will Win

To those who have been downhearted at times in the face of an unprecedented economic upheaval, we say:

Be as the outstanding quality of our product: It's *tough* and can stand a lot of pounding and hammering without sparking or falling down!

And just as we have always striven to develop a better and better wire to meet your exacting requirements, so will the electric railways, we are confident, rise to any situation that may be put up to them through the rapid growth of our cities and the still more rapid growth of car riding in those cities.



Bridgeport Brass Company

Bridgeport Connecticut

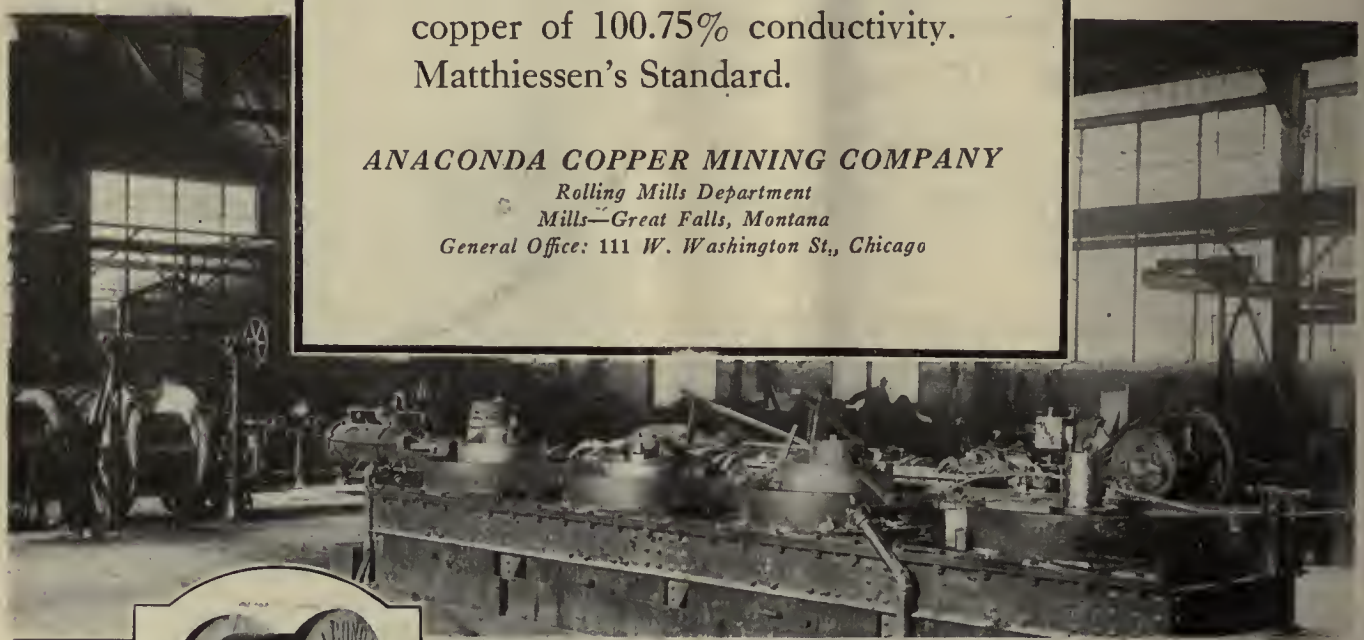
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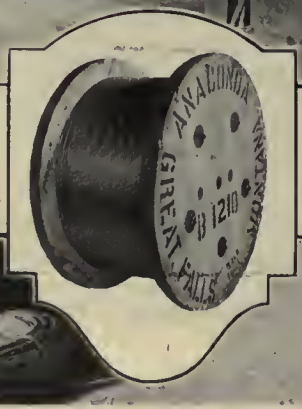


Anaconda's Rod and Wire Mill, located on the Missouri River, close to one of the greatest natural water power sites in the country, is equipped with the most up to date machinery obtainable to manufacture all commercial sizes of hot rolled copper rods, bare copper wires, cables and trolley wires, out of Anaconda Electrolytic copper of 100.75% conductivity. Matthiessen's Standard.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department
Mills—Great Falls, Montana
General Office: 111 *W. Washington St., Chicago*

Trolley Wire Drawing Bench at the Anaconda Mills





ANACONDA Copper Wire
"From Ore to Finished Product"

Who Benefits Most?

WHEN the electric Railway extends its lines into new territory, who benefits most? Is it the railways themselves, or is it the manufacturer of motors, or rails, or airbrakes or trolley wheels or track grinders or fare boxes or welders; or is it the man who sells lubricants or headlights, or bearings, or fuses, or overhead line materials?

Or, again, is it the man who lives along the right of way and who enjoys better service as the result of the extension? Or is it the building contractor who enjoys more business on account of the impetus given to home building because of the extension? Or is it the butcher, the baker, the grocer, the clothier and all the other tradesmen who sell more of their products to the new families that come into their territory as soon as the extension is completed?

As a matter of fact they ALL benefit. Some of them, possibly without realizing it—*all* of them *more* than they realize.

Let's carry facts like this to the public and the prosperity of the Electric Railways and the prosperity of every manufacturer of Electric Railway Equipment will be assured.

Manufacturers of trolley wire, strand and bare copper wire.

ANACONDA COPPER MINING COMPANY

Rolling Mills Dept: Great Falls, Mont.

General Offices: 111 W. Washington St., Chicago



Why does pavement last longer when the principle of

Resiliency

is applied to the car tracks?

The Asphalt cushion of the Resilient Railway Tie gives an unvarying deflection to the rail under the weight of the cars. Not too much as in the case of wood ties working in ballast nor too little as in monolithic construction. The joint ties prevent all working at the joints.

These things accomplished by Resilient Ties make toward pavement permanence.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BLDG., DAYTON, OHIO



Boyer Chipping Hammer, Type K, finishing large cast-steel gear

Do you chip pneumatically?

HERE is a widely popular Boyer Chipping Hammer—the Type K—that is ideal for general machine shop, foundry and allied work.

Boyer Chipping Hammers have the same built-in qualities as the famous Boyer Riveting Hammer itself; fast-hitting power, freedom from wasteful vibration, accurately fitted air-tight parts made from finest materials carefully heat treated, and day-in-day-out dependability that spells *low upkeep.*

Boyer Chipping Hammers are made in a wide variety of types and sizes for every conceivable chipping, calking, beading, scaling or light riveting job. And *stock delivery* is procurable from any Company Branch.

Ask for new instructive Pneumatic Tool Catalog 560.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building · 6 East 44th Street · New York

*Sales and *Service Branches all over the World*

*Birmingham *Boston *Buffalo *Chicago *Cincinnati *Cleveland *Detroit Eldorado El Paso Erie Franklin Houston Joplin *Los Angeles Milwaukee *Minneapolis *New Orleans *New York *Philadelphia *Pittsburgh *Portland Richmond Salt Lake City *San Francisco *Seattle *St. Louis Tucson Barcelona *Berlin Bombay Brussels Buenos Aires Cadiz Christiania *Fraserburgh Havana Honolulu Johannesburg Lisbon *London Madrid Milan *Montreal Osaka *Paris Seoul Tokyo Toronto Vancouver Winnipeg

P 92

BOYER PNEUMATIC HAMMERS · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · · VACUUM PUMPS · · PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES · · ROCK DRILLS · · COAL DRILLS

BOYER HAMMERS

The world's standard — *wherever rivets are driven*

INDIANAPOLIS



Indianapolis Apex Welded Joints will extend the life of your track from three to seven years as it has done on hundreds of electric railways.

The cost of a renewed joint including grinding is microscopic as compared with the alternative, replacing with new rail at a new high price level and with even higher priced labor than ever before.

Rail ends that are 3/16-in. to ¾-in. or even an inch apart, and badly bent or cupped have been built up as strong as new steel rail with Indianapolis Apex Joints.

If your joints are bad, splice bars all battered down, bonds loose and broken off, there is but one thing left to choose from and that is the Indianapolis Apex Joint.

Thousands of miles of track whose conductivity is equal to if not greater than that of the unbroken rail have been reclaimed by Indianapolis Apex Joints. The answer is no bolts—no bonds—no maintenance.

Write for details

INDIANAPOLIS SWITCH & FROG CO.
SPRINGFIELD, OHIO

The Good Samaritan
Won his Reputation with A Cup of Cool Water

Lots of passengers will kick up more fuss over a slight inconvenience or discomfort en route than they would over hours of delay.

There is no time like the present for building goodwill —never a time when the public was so susceptible to thoughtfulness and extra care.

DIXIE Cup

Penny Vending Machines for Passenger Cars and Stations

build goodwill by promoting your patrons' comfort. This service is self supporting—not an expense. It is standardized on one hundred and fifty transportation lines.

INDIVIDUAL DRINKING CUP COMPANY INC.
HUGH MOORE, President
Original Makers of the Paper Cup
220-230 W. 19th St., N. Y.



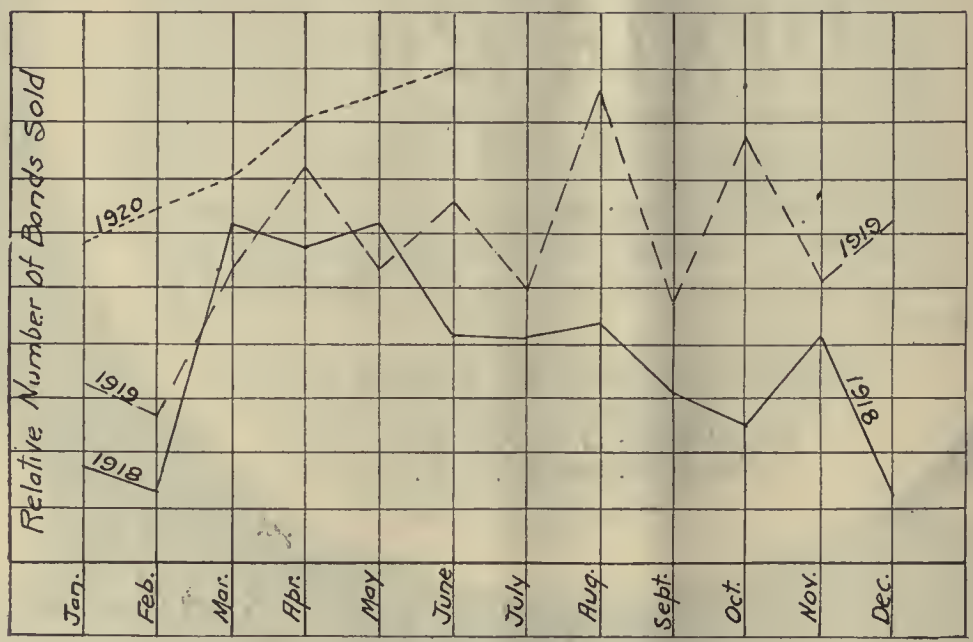
Improvement

The curves in the chart shown below, picture graphically the extent of our business with electric railways during the first six months of this year, as compared with the years of 1918 and 1919.

We call attention to this comparison as justification for our confidence that the electric railway industry is entering an era of prosperity.

We hope that the curves and our interpretation of them will lead you to an examination from data of your own and that our conclusion will be verified.

We are very confident.



Note the steady upward trend

of the curve for the first six months of this year and compare it with the wild fluctuations of the curves for the years 1918 and 1919. The 1920 curve shows a firm and steadily increasing business.

The curves are based on the number of rail bonds shipped; the element of cost does not enter.

IMPROVEMENTS? The word has a double significance for us. ERICO articles imply improvement.

The ERICO PORTABLE APPARATUS for bonding rails and for general arc welding work, is in itself an improvement over old ideas and methods and is one of the greatest factors toward bringing about maintenance improvements on Electric Railway properties.

Return circuit, track, rolling stock, all come within the range and delivery of this indispensable apparatus.

Write for detailed information and prices.

The Electric Railway Improvement Company

Cleveland, Ohio

The cordial reception given to our series of advertisements which appeared in the popular magazines during the first half of the year under the general head of "A Little Adventure in Good Will" has indicated to us that we are building a structure of lasting service.

We are therefore glad to announce to our good friends in the electrical industry and public utilities that we are planning to continue our institutional advertising along the same lines.

The advertisement reproduced on this page is one of the second series of ten scheduled to appear in eleven popular magazines during the last half of 1920. The entire series will shortly appear in a pamphlet entitled "For Better Public Relations." A copy will be sent upon request.



The Public Be Jammed!

Nothing like a ride in the street car at rush hour, if you're feeling lonely. There you will find companionship a-plenty.

Friendly elbows digging into your ribs, a foot or two placed affectionately upon your own, an umbrella handle caressing the small of your back.

This is the mode of travel we Americans apparently prefer. At any rate it is all that we pay for.

Yet, through the brave effort of two or more bodies to occupy the same space at the same time may be interesting as a scientific experiment, to the health of the contestants struggling in the foul and germ-laden air, it holds a menace.

But after all, the street railway can't give us any better service than we pay for. Whatever extra cars, extra seats, extra speed we desire can come only from the money we furnish.

The service of street railways, whether owned by the public or by private interests, must be paid for by the people who ride.

So, how much we pay and what we consider worth paying for, are questions purely up to us.

In the face of rising costs for material and labor, shall we hold our railways down to the old fare—and watch the service become less and less adequate as their resources shrink?

Or rather, shall we spend a few cents more each day to keep the street railway equipment in good order, to build up a better service for our own comfort and convenience, and even for our health?

Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.

Western Electric Company

No. 12. *Western Electric—an organization which through half a century has had a share in bringing the convenience of electric light, power and communication to millions of Americans.*



CHAPTER ELEVEN

THE ALL-*BUT* PERFECT STATE

The Willing Spirit and the Weekly Wage

The electric railways of the All-But Perfect State will be founded on a super-golden rule reading:

"If the spirit is willing—make the flesh come across too—*it pays.*"

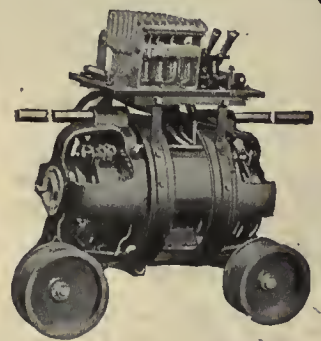
No man *willingly* holds up production—each man *wants* to turn out a big day's work—but there's a mental hook-worm that whispers, "why hurry?"

In the All-But Perfect State—the *need* for any work or any materials will be next thing to the fulfillment—for the people will have self-interest at heart—each will feel his own responsibility and shoulder it.

Each will recognize the local road as vitally essential to his community and each according to his standing in the community will plug *for* that road—not *at* it.

Having a community *with* the road there will be no local railway problem. Having *every* community that way there will be no national problem.

Any problem is but a condition of the mind—and a condition of the mind can be changed as easily as changing the condition of a track with the Dynamotor for bonding and welding.



READING NUMBER ELEVEN.

Q. Is the Dynamotor a *necessary* piece of railway apparatus?

A. Roads can get along without it—but most roads won't because it costs too much to bond and weld by other means.

—and they get such poor jobs by the old method.

Rail Welding and Bonding Company

formerly The Lincoln Bonding Co.



Cleveland, Ohio.

ACKLEY BRAKES
Found The World Over

Lightness and Dependability but above all—*Dependability*

The ACKLEY NO-STAFF

(Bulletin D)

Pressed Steel Pedestal
Electric Steel Gears

No Sprockets on Winding Drum to Cut the Chain



Minimum Weight

Maximum Reliability

You can't choose better for your light cars



If interested in a staff brake, ask for Bulletin E descriptive of the Ackley 2E Brake

ACKLEY NO-STAFF TRADE BRAKE MARK

ACKLEY BRAKE & SUPPLY CORPORATION
G. S. ACKLEY & COMPANY, REPRESENTATIVES
50 Church Street, New York, U.S.A.
Agencies throughout the World
Cable address "Acklebrake"

ACKLEY 2E BRAKE





Maysville, Kentucky, showing street scene before and after Elreco Combination Railway and Lighting Poles were installed.



Good Public Relations

SHORTER headways, faster schedules, greater safety, more comfort and real courtesy have done wonders in getting the good will and support of the public in certain localities. Once the public gets behind the local property, it will not only boost the railway but it will be more vitally interested in the railway's problems.

If the electric railway company favored the elimination of old heavily-laden wooden poles, and dilapidated span construction, it would be much easier to receive an unbiased hearing on a fare increase than if it assumed an arbitrary attitude when approached on the subject of overhead wiring conditions and new pole lines.

In some of the best appearing cities in the United States, electric railway companies and the city authorities have gone 50-50 on a real "White Way"—which has been a success in every instance because it is good business for all concerned.

Electric Railway Equipment Co.

Cincinnati, Ohio

30 Church St., New York City

The electric railway industry is not on the skids. It is still a fine field for endeavor.

Convention speakers discuss the gloom that seems to cloud the future, and a stranger may adjudge the industry ready to lie down, but only a stranger to the individuals who guide the industry will take the discouraging view.

The industry is not on the skids so long as it has the support of the men who have carried it through the past hazardous days to its present state of efficiency.

We believe in the industry and have faith in its future. The public relations situation is growing better, the need for satisfactory revenue is more widely recognized, and the operators themselves are taking a keener interest in every means for lessening the cost of giving good service.

All conditions considered, the electric railways are operated today at a far higher efficiency than ever before.

We are endeavoring to help in this drive for economy. Our service is to assist in the reduction of car energy consumption.

Consider that electric railway which has paid much attention to effect economies in power generation, distribution and the return circuit, and likewise has installed highly efficient motive-power equipment on cars of consistent weight operated in carefully planned schedules. It still has a full opportunity for reducing its energy consumption.

Substantial savings can be made by training the motormen to have in mind "power saving" in addition to "safety" and "service." And the road with the most highly trained men can still show a very worth-while economy in energy consumption if it will give its motormen an energy-checking device for use as a tool to help them check and stimulate their individual improvement.

The Sangamo ECONOMY Watthour Meter is such a "power-saving" device. Its performance on more than 50 roads has shown that it is inseparably *linked* to safe and efficient operation.

L. E. GOULD,
Economy Electric Devices Co., Chicago.

To the Railway Executive

YOU men who have put ten, fifteen, twenty years and more of service in the street railway business, have more at stake than anyone in the improvement of general conditions in the industry.

You are the ones to help it back on a more sound and healthy basis. It can be done, provided everyone pitches in and gives the best that is in him—for the good of the industry first and his own good as well.

There are many things that must be done. Many are available almost for the asking, the terms are so generous. Johnson Fare Boxes, for example, will pay for themselves in the first two months.

Over two hundred roads are now using them and Metal Tokens, but there are many others which could profitably do so. They eliminate loss of time and delay to the service and increase the revenue reaching the treasury from 3 to 10 per cent.

As evidence of our confidence in the security of the industry we have just erected a new plant with double our previous capacity to take care of the constantly increasing demand for Johnson Registering Fare Boxes.

JOHNSON FARE BOX COMPANY,

New York Office,

The Outlook

THE greatest optimism for the industry has come out of the knowledge born of the experience of the last year—

That the number of potential riders is constantly increasing.

That the number of riders increases practically in direct ratio to the number of car miles operated; or stated another way

That the number of riders may be enormously increased by improved service.

That for this expanding market for transportation the nickel fare has been generally acknowledged as inadequate, and has been widely replaced by 6, 7, 8, 9 and 10c. fares.

That a change to a new, higher fare does not drive patronage away except temporarily in some cases.

And that the collection of these multi-coin fares can be handled with a minimum loss of time or money when

JOHNSON FARE BOXES

and Metal Tokens are employed. This retains the advantages of the old unit fare.

4619-4625 E. Ravenswood Ave., Chicago
50 E. 42nd Street

Has Every Man in Your Organization Put His Shoulder to the Wheel?

There is a new spirit in the electric railway industry—a spirit of conservative optimism and vision.

No man is blinding himself to the obstacles ahead. Neither does he refuse to see that the industry is headed right and moving forward.

The future of the electric railway industry is assured by its essentiality. But the time required to bring it back to normal prosperity and progress depends on you and your organization—on every man who has a stake in the industry.

Does every man understand fully the condition of the industry? What it needs? What he can do to help?

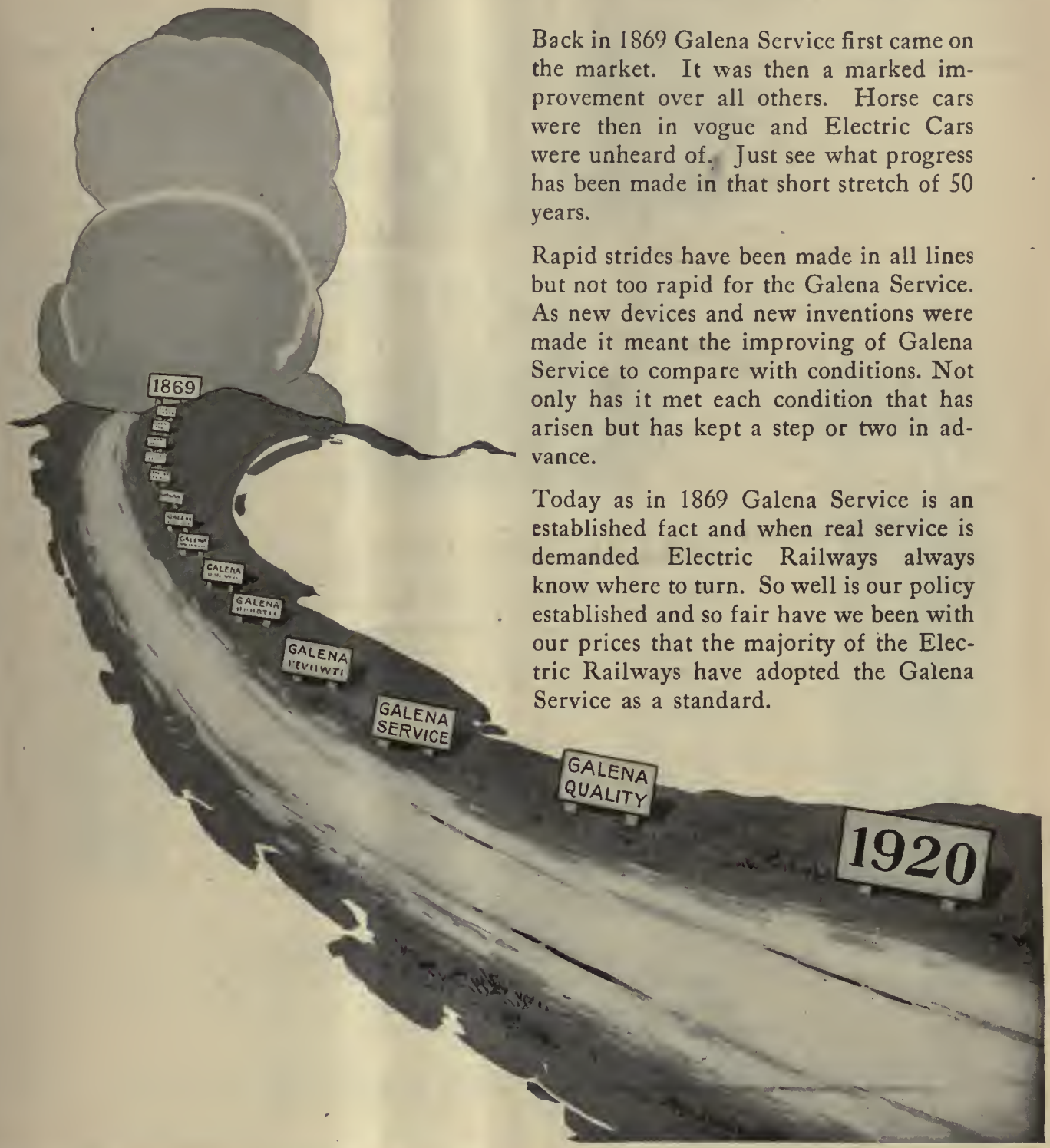
If not, you should show him the way. Every intelligent man in the industry must shoulder his part of the load. Unity of effort will accomplish wonders.

We are staking our future on the developments of the electric railway industry.

Consolidated Car Heating Co.

Albany New York Chicago

Along the Road of Progress
50 Years of Galena Service



Back in 1869 Galena Service first came on the market. It was then a marked improvement over all others. Horse cars were then in vogue and Electric Cars were unheard of. Just see what progress has been made in that short stretch of 50 years.

Rapid strides have been made in all lines but not too rapid for the Galena Service. As new devices and new inventions were made it meant the improving of Galena Service to compare with conditions. Not only has it met each condition that has arisen but has kept a step or two in advance.

Today as in 1869 Galena Service is an established fact and when real service is demanded Electric Railways always know where to turn. So well is our policy established and so fair have we been with our prices that the majority of the Electric Railways have adopted the Galena Service as a standard.

Galena-Signal Oil Company

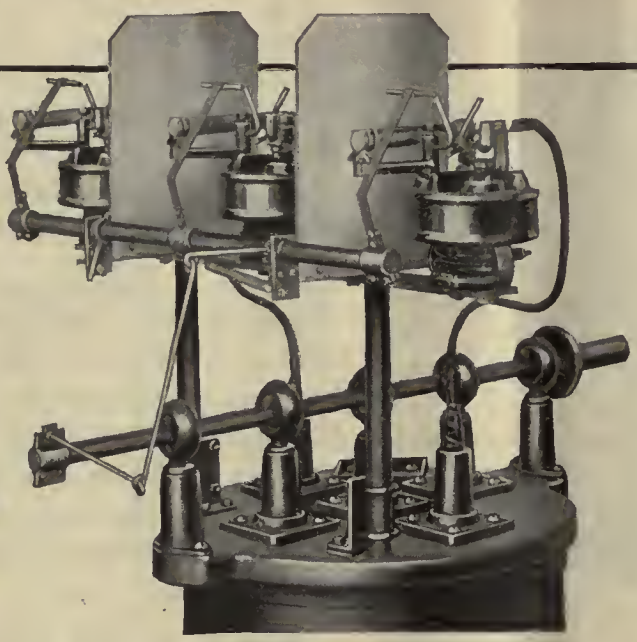
New York *Franklin, Pa.* *Chicago*

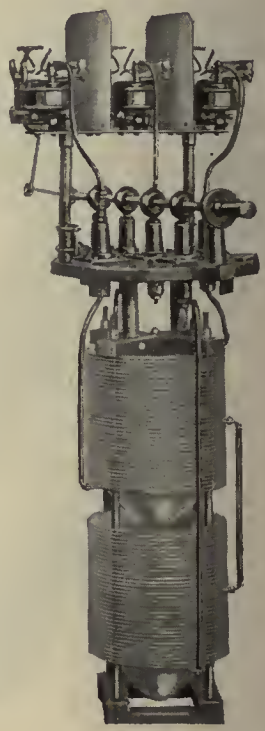
and all principal American cities

LONDON TORONTO BUENOS AIRES MONTREAL PARIS

Simplification of design and improvement are ever-present engineering problems. "It takes a long time to bring excellence to maturity"







—as in this case

THE G-E Aluminum Lightning Arrester has proved every claim made for it; the low-voltage arresters have been exceptionally satisfactory from the standpoint of both service and design, but G-E engineers saw an opportunity for further improvement and the result is shown in the accompanying illustrations.

First note the general compactness of the arresters, which reduces the space requirements. As these arresters are usually connected to bus bars to protect generating equipments, economy of space is a valuable characteristic.

Also note that the stack is attached to the cover, so that by lifting the cover the stack may be easily removed from the tank. This feature makes installation and inspection a simple matter.

Then note—to charge the arrester, simply turn the handle, pull it out and turn again. The charging operation has been reduced to the utmost simplicity.

We have made possible a saving in space, labor and time through the use of this new design. You can save your customers the annoyance of service interruptions and yourself the expense of repairs due to lightning disturbances by taking advantage of this new arrester. Made for a-c circuits from 1000 to 7500 volts.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

33E-20

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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What We Are Trying to Do

WE ADMIT, or claim, a special purpose in the present issue. If possible, we want to arouse a little plainer talk in the industry which will bring about a better comprehension of the real rock-bottom problems confronting the electric railway industry today. We desire most of all to contribute our bit to leading a discussion of what concrete, actual, homely acts each of us individually and collectively may do to bring about a sound, safe business of satisfactory transportation service.

Speaking particularly of urban and interurban systems, we are very optimistic as to the ultimate outcome. But we believe that the goal cannot be reached until each and every one of us is fully conscious of his own obligation and duty and acts accordingly. Every extra effort brings the day of success nearer. This duty is not to be taken in the narrow sense, as meaning only day to day technical tasks, but also in the broadest sense of service to the industry. We must each realize our relation to the industry and the relation of the industry's success to our individual success, to put it selfishly.

We have therefore devoted a large part of this issue to a discussion of the outlook of the industry, but more particularly to a visualization of the obligation, and the opportunity to act in response to the obligation, of each of us in his own limited sphere and as a part of the whole.

Most of us were raised in the industry. It is our very life. We have followed it through the days when difficulties were mainly engineering and construction, rather than public relations and financial. And we have enjoyed a profitable and pleasant business.

Are we going to be any the less men of courage because the problems today are different? Are we going to allow to stand as justified the accusation of one prominent public utility commissioner that utility men come before commissions "with a whining voice and a suppliant attitude"? Are we ashamed of our business?

No! By the shades or living selves of Frank J. Sprague and Oscar T. Crosby and their mates, we believe this industry is still composed of men with backbone, men who will work and are capable of tackling any problem. The trouble is that some of us seem to have been gassed, and as we came to and saw the crowd going by have got in the habit of talking about what the other fellow can do to help us back on our feet.

What we need most is to help ourselves first. Without deprecating efforts at public appreciation of the situation, a most necessary work, we need more inside effort. We talk about wanting to be a business like other business, so let's start out and act that way. Now, the first principle of most business is to increase production, decrease expenses and sell the goods at a fair profit. On electric railways that means more riders at less cost and at adequate fares. Let's talk more about our side of this problem—not so much about what the public should do, but what we can do. If we handle our end of the problem correctly the American public will, by our very acts, be forced to take its right action.

No one is perfect, and this journal does not claim immunity from criticism in this regard. But in this issue we have tried to assemble some articles and statements, long and short, from various representative men of the industry, the public and the related interests, with these chief aims in mind, to start more "peppy" discussion, to get a little more inside the industry talk, to see how we can do our job better, to study our own obligation to the industry, to see how far the public actually has an obligation, to show how closely knit is our own individual success with that of the industry and, above all, to show how each of us can do things in our daily work and in our relations with the public to make for real progress.

Let's All Pull Together

LET'S get our shoulder to the wheel. We all say the railway must come out all right in the end, but the harder we work now the sooner will that resumed success be realized.

Did you ever see a gang of roustabouts doing a seemingly impossible human task? Hear their singsong, "Heave! heave! heave!" as they all pull at once, with only one purpose, to get that job done. No matter how hard the labor, it's a happy singing gang and the spirit is contagious.

We need a little more of that too. We need the

best in each of us. Are we giving our best thought and efforts to the common problems of the industry or are we pulling each in his own direction? Are we doing all we can to lend courage and inspiration, to bring about unity of effort?

What are you going to do about it individually? Action is what is needed—your action—our action, and, most of all, concerted action.

We are all a little baffled that the various suggested remedies aren't made effective. Is it because we are waiting for the other fellow to make them effective? Let's get together with him and work with him. It's our problem, not the other fellow's. He's not interested, many times. What we must do is pull together for our own ultimate salvation.

What Can We Do?

YES, what does the industry need and what can we do are the practical questions. We hope some answers will be found in the following pages, or that, at least, some answers may result from these and subsequent discussion. The views expressed have been solicited by this paper and represent every branch of the industry. We believe that they are all constructive and furnish general and detailed suggestions of the ways in which each and all of us can help to put the industry back where it belongs.

Of course, we need the public's comprehension—not sympathy, for we aren't down yet, rather we're coming up—and we will get that comprehension as we deserve it and work for it. But fundamentally, our first line of attack is the business itself—more revenue from higher fares is necessary, but we must not forget that more revenue can come also from more sales and decreased cost by maximum operating efficiency. There are ways of doing these things and we can each help.

We can give definite acknowledgment of our own obligations.

We can express our confidence in the future of the industry.

We can each help sell the needs of the industry to our individual acquaintances and convince those that we meet that the prosperity of the community is bound up with a prosperous transportation system.

We can get behind big movements and utilize every instrument for better transportation.

Precedents are all right when they are good, but we must have courage to discard them when better ideas and methods are available.

The "Electric Railway Journal" wishes to acknowledge its own deep obligation, to put its shoulder to the wheel and do its share to work for the realization of the aims of the industry.

Wanted: A Handbook of Technical and Allied Organizations

THE number of technical, scientific and related societies is increasing so fast and their names are used so much that it is becoming ever more customary to use abbreviations in referring to them, as our English brethren have done for so long in the same field. It's a knowing engineer these days who can recognize all of the abbreviated titles, many of which are so similar as to invite confusion. In the railway field we have the A. R. A., the A. E. R. A., the A. R. E. A., the A. E. R. E. A., etc. The schools don't teach the alphabet any more, but it looks as if they would have to take it up again, at least for part of the population. And then the societies are changing names so rapidly that even the members have a hard time keeping up to date. At the recent A. R. A. convention we heard reference to the American Railway Association, the Master Mechanics' Association and the Master Car Builders' Association, all of which, now comprehended in the American Railroad Association, went out of existence in name but not in fact during the war-period régime.

All of this preamble is simply to point to the need, voiced recently to the writer by a prominent engineer, for some kind of a "Baedeker" for these societies. It would have to be an annual, if not a monthly, adequately to keep within speaking distance of accuracy. Possibly the new Federated American Engineering Societies will tackle the problem. Anyway, somebody ought to do it. Such a compilation should show, among other things, for each society, its history, purpose, plan and scope of work, organization, nature and requirements for membership, relation to other societies and government bureaus, publications and address of secretary.

A clear concept of the nature and field of each society on the part of all would prevent some of the duplication of work that well-meaning committees lay out for themselves, or have laid out for them, when similar work is being well done by pre-existing agencies.

The Coaches Can't Do It All

WHEN you see a football team on the field pushing its way toward the goal and victory you never think of the coach. It's the men on the team who must do the fighting at the showdown.

The railway industry has about 5,000 coaches and 300,000 players; isn't it about time for the teams to take the field? When it comes down to facts, every employee is interested in the railway industry, financially and morally, simply because it supports him and has done so for years, and now that the industry is up against it it's his duty to jump in and win the game.

It's difficult to predict what would occur if every employee in the railway industry, realizing his vital influence in molding public sentiment, became an active player and bucked the line with all his strength. Three hundred thousand boosters sifted among 100,000,000 neutrals and 50,000 knockers and demagogues could turn the tide of public sentiment in a hurry.

Why not institute a Railway Drive and pour out the truth about conditions? Every employee realizes conditions in the industry, but has not had brought home to him his selfish interest in getting improvements. Let's have teamplay in work and in publicity and a real

ame. Every player should "talk it up" and put "railway pep" into his conversation with the rooters.

Let the coaches remain on the side lines while the eams tear up the dirt of ignorance and prejudice.

Now Is a Good Time to Get Out of that Rut

THE engineer has often been characterized as a narrow specialist, necessary of course, but procurable at a very moderate wage. This was partly his own fault, because he often, maybe usually, allowed his interest in things and their laws to absorb him to the exclusion of people and their ways and whims. Now his condition is rapidly changing; the master mechanic and the civil engineer in the electric railway field are taking an active interest in car schedules, for example, while the power plant man is helping to save energy as well as produce it.

The writer was greatly pleased recently to find an eminent rolling-stock superintendent keenly alive to the problem of collecting a new fare involving several coins. Really, that's an engineering problem. At another point an engineer of power was applying analytical methods in studying car operation for maximum economy; also an engineering proposition. And this thing works the other way round, too. If the manager sees his engineers taking an interest in general transportation matters he will reciprocate, "vicey versey and the same," as a once well-known character in fiction was wont to say.

The hard sledding which the industry has experienced of late has caused all departments to pull together as never before. If anybody is still in a rut he ought to get out of it now or quit.

The Electric Locomotive Was Born Grown Up

THERE is an important element of difference between the development of the steam and the electric locomotive. The former grew up with transportation, the latter had to be designed and put into immediate competition with a rival perfected through decades of gradual evolution. The term "perfected" is used here, of course, in a "Pickwickian sense," for the steam locomotive has made some of its most remarkable progress during the past few years, and its rate of change in this regard is as rapid now as ever in its history. Mr. Basford's paper at the A. R. A. Mechanical Section convention furnishes convincing statements along this line. At present it is making up for lost time, like the boiler in the stationary steam power plant, and the lessons learned in power plant practice are being applied on this traveling power plant with great reduction in coal consumption. On the whole, however, progress has been slow and steady. On the other hand, the modern electric locomotive isn't more than fifteen years old.

These remarks are made because, as one hears of occasional trouble with this or that electric locomotive, he is apt to conclude hastily that this type of machine is not up to the job. Not so, however, for in spite of some high maintenance costs the machine as a class is performing splendid service, often overloaded beyond reason and each individual doing the work of several steam engines and doing it better. Just think where the electric locomotive would be today if it, too, could have started back in transportation year 1.

Chicago Is Grappling with the Automobile Problem

RECENT action of a committee of the Chicago City Council in recommending the prohibition of all vehicle parking in the congested downtown district calls attention to the serious problem which is presented to local transportation companies in all large cities. The Chicago anti-parking ordinance of 1917, prohibiting the parking of vehicles along car line streets in the Loop territory during morning and evening rush hours, was considered revolutionary at the time, but proved an ideal measure for the benefit of the traveling public. Studies made during the first few months of this experiment showed that the saving in time for cars using the downtown streets was 5,000 minutes during the three rush hours of the afternoon. The police were zealous in its enforcement, and the records of the automobile court showed that scores of drivers were being penalized every day for violation of the ordinance. Later on the police traffic squad was reduced in number, and with changes in the courts there was a slowing up in arrests and fines. Meanwhile, thousands of automobiles were added to those already using the streets and serious congestion resulted.

There was another Chicago ordinance which permitted vehicles to stand in one place as long as thirty minutes on streets other than those where cars were operated. The result was that such streets were used as public garages, and if an automobile owner was at all fearful of arrest he would have his car moved a few feet before the thirty-minute period expired. The police found it practically impossible to prosecute such cases successfully. It is now proposed to extend the anti-parking prohibition to all downtown streets between the hours of 7 a.m. and 7 p.m., and the police officials are hopeful that with a general understanding that there will be no place to leave cars in the downtown territory drivers will find parking places outside or use regular garages. An immediate relief in congestion is expected.

Other cities have adopted measures of various kinds to regulate vehicular traffic with a view to the more prompt movement of passenger cars. In some places the one-way traffic rule has been found effective. In others the width of sidewalks has been reduced so as to leave a wider space for vehicle travel or necessary parking. In certain cities pedestrian traffic is regulated and persons waiting for cars are guarded by safety islands, while controlled signals direct the movement of vehicles.

All these measures are good in their way and undoubtedly help to attain the object of serving the great mass of the traveling public. Even one-way traffic has its limitations, however, and a recent suggestion to inaugurate such a plan in Chicago led to the objection of experts that congestion would be intensified by the change. Local conditions govern in this particular as in many others. If streets are narrow or have only one car track it is sometimes better to have all traffic move in a single direction. If, however, the normal course of travel is two ways on a given street the situation can hardly be improved when it is necessary to direct a considerable proportion of the vehicles around three sides of a square so they may enter from the proper direction under a one-way rule. Haphazard attempts to regulate traffic without careful survey are bound to make confusion worse. Traffic must be made to fit conditions rather than try to have conditions adjusted to suit traffic.

How the Electric Railway Enters the Life of Each State



The above map indicates graphically the single track electric railway mileage in the various states. Here is an industry which has in each state become an important part in the economic and social life, in many states a vital part. Is it conceivable that the men in and behind this industry can do else than succeed in the work of maintaining it as an essential service to the community and at the same time of obtaining from the public of the community a recognition of its true character and value?

Situation Is Fundamentally Sound

The Paramount Position of the Electric Railway in Local Transportation Service Has Been Unaffected by Bus Development—Commissions and Public Are Realizing the Necessity for Fair Treatment of Utilities—Advantages of Individual Action and Co-operation Through Association Are Presented

By JOHN H. PARDEE
President American Electric Railway Association

AFTER the distressing period from which the electric railway industry is emerging it is a pleasure to be able to strike a note of optimism as to its prospects. I believe that the future looms much brighter; that there is reason to take hope, and that our time of greatest gloom has passed away, not soon to return.

This impression comes, not from a study of the financial statements of the companies, which are still too liberally dotted with red to provide much encouragement, nor from a contemplation of the physical condition of the roads, which, due to the impossibility of securing new funds for rehabilitation, is in most cases deplorable, but it comes from a firm belief that the great public of the United States is coming to a better understanding of the electric railway problem as it affects itself and the companies and is disposed to enter into settlements which will continue the utility in a higher state of efficiency and will recognize the rights of those whose money is now being used and of those whose money is now being sought for the furnishing of an essential public service.

The situation has resolved itself into one in which the main object of both the public and the companies must be the restoration of electric railway credit. Except in a few isolated cases, municipal ownership and operation is not under serious consideration. The state operation of the Boston Elevated and the Massachusetts Eastern railways has brought increased and not decreased fares. The city of Seattle, which, rather than grant the necessary fare increases to a private company, purchased and began the operation of the city system, has been forced to a 10-cent base fare in order to cover the cost of the service. The people of San Francisco, where municipal operation is conducted under exceedingly favorable circumstances, are gradually awakening to the fact that there is no virtue in the slogan "Municipal Ownership" that enables operation at less than cost and that a low fare is there being maintained at the expense of reserves, which are necessary to the future welfare of the property. Detroit, pledging its credit for a $15,000,000 bond issue to secure a half-way municipal system, finds that service is no better and that something more than mere political expediency is necessary to the provision of local transportation. It is apparent to any one who will seriously consider the situation that electric railway transportation is still a necessity to all of our communities of any size and that it must be provided through the agency of private enterprise and private capital. The serious business of both the public and the companies is therefore the adjustment of the business of these utilities and their relations with the communities, so that the confidence of the investor will be reawakened and that flow of capital, without which public utilities in growing communities cannot long exist, will be resumed.

Motor Vehicle Not to Be Feared

I have no fear that the motor vehicle will intrude itself into the situation to an extent that will imperil the usefulness of electric transportation upon tracks. In this connection two recent occurrences stand out in bold relief. It is of the greatest significance that Mayor Couzens of Detroit, himself an automobile man, whose long term as general manager of the Ford Motor Company gave him a knowledge of the possibilities of the internal combustion engine and who has had wide experience with the extended use of the cheapest and most adaptable car on the market, totally and utterly rejected the motor bus as a means of providing transportation, although every interest dictated that he should adopt the best and cheapest method in his attempt to compete with the Detroit United Railway. Of equal significance is the fact that Henry Ford himself, while advocating a self-contained vehicle propelled by a gasoline engine for interurban use, clung to rails and refused to entrust his new device to rubber tires.

Nowhere in the United States is the motor vehicle giving a complete system of local transportation in any but the very small communities. Faced with the choice between street railways and the jitney, the Massachusetts cities served by the Eastern Massachusetts Street Railway have unanimously decided in favor of the former and have eliminated the latter from their streets. I have no doubt but that the city of Bridgeport will make a similar choice.

Those cities in which unrestricted jitney competition is now permitted must, in my opinion, soon make a similar choice. I do not believe that the electric railway can hamper the development of the motor vehicle. I do not believe that it should do so if it could. I do believe, however, that the motor vehicle has no greater rights than the electric car, and that it should not, and ultimately will not on its part, be permitted to interfere with electric railway development. There is almost unanimous opinion among those who are familiar with electric railway affairs, and I speak now not of the owners and operators of the properties but of those who

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represent the public in their regulation, that local transportation should be a strictly regulated monopoly. Only in this way can the communities receive that full and sufficient service to which they are entitled. To introduce into the situation the element of competition is to revolutionize the entire theory upon which the relations of the companies and the communities are based and to make necessary an entirely different policy in the treatment of all transportation utilities.

Co-operation, Not Competition, of Rival Systems

It is certain, from the public standpoint, that the motor vehicle can never properly perform its task so long as it is operated in competition and not in co-operation with the electric railway. The experience in those cities where jitneys are most prevalent is that the service as a whole has not been improved or extended, but that there is a surplus of service on certain routes and in certain sections and an augmented dearth of service on other routes and in other sections.

If no other rule is applied than that which has for many years been established in connection with the construction of new steam railroads, the managers of the electric railways will have little cause to fear jitney competition. In all states possessing modern systems of public utility regulation it is the "convenience and necessity" of the public that dictates whether or not a new steam line shall be built. Competition, ruinous alike to the owners and to the public, has taught the people a lesson in relation to steam road construction. The useless waste of funds involved in the setting up of competing lines where none were required and which finally resulted in bankruptcies and consolidation, adding to the capitalization upon which in some manner a return must be earned, has caused the states to be wary of transportation schemes which serve no useful purpose. From this lesson the communities must borrow wisdom and ultimately recognize, first, that the motor bus in local transportation is a common carrier, subject to all the duties of a common carrier, and, second, that only when the power lodged in the regulatory authorities is insufficient to force the rendering of adequate service by an existing carrier is it to the public interest to set up a competing carrier, the operation of which duplicates expense as well as service and in the long run will impose an unwarranted burden upon those who depend upon local transportation service in their business and social life.

These are fundamentals of the situation which must be thoroughly appreciated and understood if we are to speculate as to the future of the industry. The chaotic conditions which exist in many cities and in many towns are not conducive to dispassionate consideration, and they make it difficult to take a broad view of the field and to realize that ultimately the outcome will rest upon principles rather than upon merely local disturbances. Such a broad view establishes, to my mind, first, that the service performed by the electric railways is essential; second, that it cannot adequately be performed by any other known means of locomotion, and, third, that it must be performed by private enterprise and through the use of private capital.

If this be admitted, then the necessity of restoring electric railway credit is apparent, and it is equally apparent that such restoration can be accomplished only through the recognition by the people of the fact that private capital cannot be coerced, that it must be assured of fair treatment and a fair return, and that private enterprise will be serviceable to the public only if it be given latitude for the initiative which is its distinguishing feature and rewarded in accordance with the efficiency with which it performs its task.

Impress These Truths on Public Mind

The real work before the electric railway industry today is that of impressing these truths upon the public mind. A start has been made. The attitude of the public toward the industry is more favorable today than it has ever before been in the history of the electric railway business. There is a keen realization that these companies are in distress and that they must be given relief. The position of the state commissions is in the main distinctly helpful. Many of these bodies have had completely to change their viewpoint in order to acquire a realization of the truth that their duty is as much to protect the companies from the effect of causes over which they have no control as it is to protect the public from any acts of the companies, but I think it may be safely stated that there are few public service commissions which do not now clearly see the necessity of building up and strengthening the companies in the public interest. The attitude of the city authorities is also becoming more favorable. It is not difficult to pick out numerous communities whose officers have yet to learn that the preservation of local transportation service and not the furthering of political ends is the thing most desired by the public. But to offset this deplorable state of affairs there are many gratifying instances where intelligent, helpful, public-spirited action has come from city councils and commissions and where there is earnest effort to arrive at an equitable and just basis of relationship.

"The public is willing to listen. It wants to understand and it is our business to make sure that the public shall understand. The great mass of information released through the deliberations of the Federal Railways Commission has had an effect which it is hard to overestimate. Unfortunately that commission has not yet reported its findings to the President of the United States, but even if it never reports, the industry will still be the gainer, because, through the publicity secured, the facts of a lamentable situation are now known, and the public has come to realize that the question is not one which concerns the owners and operators of the properties alone, but that it intimately concerns every man, woman and child in the entire country."

What the Association Is Trying to Do

In these circumstances the crying need is for a real understanding of the problem to be solved, both on the part of the railways and upon the part of the public.

The American Electric Railway Association does not and will not propose a universal panacea which is to cure all the ills that afflict the industry and which will

prevent it from performing its full duty in the public interest. The case is too complex to make its cure possible by any one remedy. But through its deliberations and its investigations the subject has been greatly clarified and there has come into being a body of opinion within the industry which if it can be transmitted to the public and the public's representatives gives promises that the electric railway problem will be settled and will be settled correctly.

The association should lead the thought of the industry in this particular, as in many others. Through it there should be rendered available for every electric railway executive in the country the best thought of the industry. I am convinced that the association can perform no greater service than by frequently bringing together in conference the men whom we have all grown to regard as our leaders and by spreading before the country their conclusions as to the vexed problems before us.

The public is willing to listen. It wants to understand and it is our business to make sure that the public shall understand. The great mass of information released through the deliberations of the Federal Railways Commission has had an effect which it is hard to overestimate. Unfortunately that commission has not yet reported its findings to the President of the United States, but even if it never reports the industry will still be the gainer, because through the publicity secured the facts of a lamentable situation are now known and the public has come to realize that the question is not one which concerns the owners and operators of the properties alone, but that it intimately concerns every man, woman and child in the entire country.

Let us continue to extend, as we are now attempting to do, that process of public information. There are many channels open to us. The public utilities have had a prominent place upon the program of two successive conventions of the Chamber of Commerce of the United States. Other national organizations have welcomed speakers representing the industry and have given them sympathetic hearings. The opportunity for presenting our case is unlimited. The local manager who does not take advantage of the present frame of mind is remiss in his duty to his company. It is not necessary that he should be an orator. It is sufficient that he should be informed, that he should believe in his cause and that he should place the facts before his hearers.

This is not the time for pessimism. The discouragement and rebuffs of the past must not be allowed to interfere with our present task. The process of public misinformation has been a long one. That the electric railway situation is today so widely misunderstood is largely our own fault. That intangible something known as public good will is to be gained and kept only by continually keeping up the process of public information. It is hard, discouraging, many times a thankless task, but it is worth while.

Membership in the Association a Privilege and a Duty

The association can and should lead, but the association's usefulness depends upon the co-operation of the electric railways of the country, and it can be of no greater use than these railways make it. When it speaks for the industry it should speak for all the industry. When it acts for the industry it should act for all the industry. It has performed a great work, but it is capable of performing a much greater one. Whether it will do so depends upon the support that is given it, and for this reason and because the national aspect of the electric railway problem underlies all local questions, and because public sentiment spreads as the ripples on a millpond, I consider that membership in the association is not only a privilege but a duty for every electric railway in this country and in Canada.

The Industry Merits Our Best

Shun Expediency—Get Together—Do Not Bemoan Conditions, and Thereby Attract Mediocre Ability

By EDWARD DANA
General Manager Boston Elevated Railway Company, Boston, Mass.

THE industry with which we are identified is relatively young. It came into being because of an impelling necessity for its service.

That necessity was so fundamental that its early years were marked by unlimited optimism with regard to its future.

That optimism was responsible in large measure for the period of trials from which we are now surely emerging.

That optimism resulted in a disregard of sound economic laws, with the result that there was overexpansion of facilities and a price arbitrarily fixed for the commodity for all conditions and all places.

Those of us who have lived during the recent years' struggle appreciated the hopelessness of the situation as an effort was made to postpone the day of reckoning.

We cannot unmake the past, but now that the fallacies of the past are gradually being righted we can get together with both feet squarely on the ground and restore the industry to its rightful place in the eyes of those whom it serves.

The impelling necessity for street railway service exists today as never before. Its growth has created the arteries of transportation by which cities flourish and its service must continue no matter how many other means to the same end come into existence.

The industry has developed big men and given others opportunity and careers. The future success of those who have chosen it for their talent is dependent upon the future success of the industry itself.

If we belittle its importance, bemoan its past and despair of its future it will attract the mediocre, whereas it merits the best.

Above all, let us shun expediency as the solution of its every-day problems.

Whether it be the eight-hour day, request for service not justified by traffic offered or excessive payments for snow removal, paving, etc., let us talk the same language and stick to the facts and merits of the case, whether with the labor organizations, the utility commissions or local authorities.

The fundamentals are the same everywhere, and whenever these are disregarded for expediency we perpetuate the errors of the past which have been so harmful to the industry.

What Bankers Will Demand and How They Can Help the Industry

Assurance of No Reduction of Rates for Long Period; Safeguarding of Principal and Interest of Outstanding Securities—Bankers Can Teach Public Desirability of Healthy Utilities and Render Financial Aid in Temporary Emergencies

By F. H. RAWSON
President Union Trust Company, Chicago

THE unsatisfactory financial condition of many electric traction companies, as well as other utilities, is well known. Their unhappy condition is due to the very large and constantly recurring wage increases necessarily granted to all classes of employees and to the high cost of every kind of material, such as copper, steel, motors, etc., which enter into electric traction. Coal has also increased greatly in price. These advanced costs have not been met by a corresponding increase in the rate permitted to be charged, or, if a rate increase has been granted, it has been after long delay and in an amount insufficient to keep pace with the increase in wages and other costs. The result has been the inevitable. Companies have struggled bravely on until their expenses became greater than their revenue, with the result that a large number of well-managed properties have been thrown into the hands of receivers and others brought dangerously near the brink of financial disaster.

Several billion dollars of traction bonds, as well as those of other utilities, have been distributed to investors by the strongest banking houses in the United States and many millions of such bonds are held by banks. A few years ago such securities were in high favor and the men who had the courage and foresight to plan and build street car lines were acclaimed public benefactors and received the thanks of the community. All this has changed. A few of these companies were in the hands of unscrupulous promoters, and in some instances the companies and the cities in which they operated were exploited for the benefit of the promoters, so that for twenty years or more these few examples have been used by politicians for vote-getting and campaign purposes, and it has been the popular cry for them to denounce traction companies, telephone, electric light and gas companies, styling those operating them as enemies of the public. Politicians are constantly berating the companies and their service and holding out the inducement that, if elected, they will be able to reduce fares or rates. Many a mayor and alderman has ridden into office on this platform. The result is obvious. Investors have been scared away and the credit of the companies seriously impaired or ruined. The companies have been unable to interest capital and the service has naturally deteriorated. A great change in public opinion is now evident throughout the country. The first and best example of this is the intelligent and constructive legislation recently passed by Congress respecting steam railroads. The great experiment of government operation of railroads has clearly demonstrated to the public the futility of expecting good service or cheaper rates from companies politically operated. Public opinion, as reflected by newspaper editorials from every section, is rapidly coming to the conclusion that private operation under rigid and intelligent control is conducive to good service and reasonable rates. State utility commissions everywhere are listening with favor to petitions for much-needed rate increases, not only for electric car lines but also for telephones, electric light, gas, etc.

As an evidence of the intelligent thought being given by public utility commissions, and their desire to safeguard not only the public but investors as well, I quote a few lines from the recent decision of the Public Utility Commission of Illinois in granting the petition of the Chicago Surface Lines for an 8-cent fare:

"The rates hereinafter authorized are just and reasonable rates and are no more than are necessary to enable the petitioners to earn a fair return upon the value of their property actually employed in the public service."

Before there can be much betterment of service the credit of these companies must be permanently restored, and this will take time. Investors must be shown that if they purchase utility securities issued to supply money for obtaining additional equipment or building trackage not only will their interest be earned, with a safe margin, but the principal also will be paid upon maturity, and that while they hold these securities they will not see them steadily decline in market value, due to the attacks of the politicians and newspapers. Investors will not hasten to purchase utility bonds until they are satisfied that the rate-making bodies will continue in force rates adequate thoroughly to rehabilitate the credit of these companies.

One very necessary rule which I hope to see public utility commissions adopt is that when they grant an increase in rates they include in the announcement the statement that there will be no reduction in the rate for a period of at least two years. This would go farther than anything I can think of to make such securities attractive investments. Wage agreements are made usually to cover one or two years and contracts for materials can be more advan-

"One very necessary rule which I hope to see public utility commissions adopt is that when they grant an increase in rates they include in the announcement the statement that there will be no reduction in the rate for a period of at least two years. This would go farther than anything I can think of to make such securities attractive investments."

tageously made on a long time basis. Securities are issued to run for a period of years, and for these and many other reasons it is most important that the companies and investors be able to know a long time ahead what revenue they may expect.

Due to the nature of their business, bankers have a broad viewpoint of financial matters and are in a better position than the average business man to see ahead and correctly forecast conditions. Before bankers will again recommend these securities to the investing public, take them for collateral or make loans to the companies they are going to insist that the present outstanding securities and any additional bonds be safeguarded, both as to principal and interest, and that rate-making bodies allow a rate of return equal to that paid by other well-secured investments. Upon this point the Illinois commission well said, in its Chicago traction decision:

"A return which would have been regarded as reasonable under pre-war conditions is no longer reasonable under the economic conditions resulting from the world war."

At the present time the best and most attractive securities are selling to yield the investor anywhere from 7 to 8½ per cent and any utilities yielding less than these rates will not sell today in competition with other securities.

In addition, sufficient income must be assured to meet not only all operating expenses but also to enable the companies to set aside an adequate sinking fund to take care of the bonds when they mature, and, at all times, the revenue must be sufficient to maintain the property in the best of condition and to keep it free from obsolescence.

Municipal authorities and public utility commissions, when issuing franchises, have not paid much attention to the interests of the investor. They have given their attention largely to protecting the interests of the user of the utility and have not concerned themselves about those furnishing the money. Public utility commissions now recognize their dual duty in safeguarding investors as well as users of the properties and it is encouraging to note that this viewpoint is now being generally recognized. That the Illinois commission had this clearly in mind is shown by the following from a recent ruling:

"The commission in granting this relief at this time had in mind the restoration of the financial credit of these companies. The applicants, having been granted the full measure of relief sought by them, will be expected and required to furnish the people of Chicago adequate and sufficient service.

"The inevitable result of the continuance of the 6-cent fare will be the appointment of receivers for the property of the petitioners, the disruption of the unified service in Chicago and the great injury not only to the companies but to the public also. Obviously this will not insure the public welfare."

Good and adequate service goes hand in hand with the high credit of the companies. One cannot exist without the other and the commission fully recognized this, as evidenced by that part of its decision above quoted.

The public is also becoming convinced that it is much more to its interest to have adequate and up-to-date service than the inferior quality which, of necessity, follows where the revenues are not sufficient.

The other question, "What can bankers do to help the industry?" I would answer by saying that to my mind the most important and best thing bankers can do is to bring home to the public, by intelligent teaching, the fact that it is vitally interested in the proper maintenance of utility companies. Heretofore the attitude of the people toward utilities has been one of indifference, largely brought about by lack of appreciation of what the public's needs are. The average man on the street thinks that if he can procure a street car ride for 5 cents, with a transfer thrown in, he does not have to concern himself as to whether or not the company is getting enough revenue from his nickel properly to maintain itself. A little thought on his part will bring him to the conclusion that if the revenue is not sufficient it will not be long before the service will reflect this condition; that he will not get about as quickly or as comfortably as he can in other cities which afford proper protection to the traction lines, and that it is only a matter of time before the service will be discontinued entirely, or seriously interrupted. This is equally true in the case of the electric light, gas and telephone companies.

".....the most important and best thing bankers can do is to bring home to the public, by intelligent teaching, the fact that it is vitally interested in the proper maintenance of utility companies. Another and perhaps equally important thing that the up-to-date banker should do is to render financial assistance to these companies to tide them over temporary emergencies."

The general public has concerned itself little about the financial condition of the companies, thinking always of the addition in the cost of the service and paying too little heed to what would happen if such service were cut off. If it were cut off for even a short time, with the prospect of its not being renewed, it would not be long before there would be a widespread business depression in that vicinity. Factories would of necessity close down, men would be out of employment and general chaos would follow. No one is in a better position to spread this propaganda than bankers.

Other Things that Bankers Can Do

Another, and perhaps equally important, thing that the up-to-date banker should do is to render financial assistance to these companies to tide them over temporary emergencies. In many instances during the past few years bankers, individually and collectively, have loaned money to these companies to tide them over emergencies. In many cases these loans would not pass muster if judged by the usual credit standards demanded in good banking practice, but the banks have looked at the question from the point of public policy more than as a credit risk, realizing the havoc and ruin that would follow the shutting off of street car, gas or electric service through lack of money. Many of these companies would have been on the verge of having to close down had not the banks come to their rescue with loans, enabling them to pay wages due and to pay for material, thus permitting them to continue to function.

The writer vividly remembers, a year or two back, of having been called to a meeting of representative bankers, called for the purpose of advancing money to help

out a large utility company. The writer's bank had never enjoyed a deposit account or any business relation with that company, but, nevertheless, cheerfully entered into an arrangement whereby all the bankers present agreed, pro rata, according to their size, to advance the money necessary to keep the company going until its revenues were increased by order of the utility commission. Had this company been allowed to go to the wall no one could foresee the misery and loss which would have resulted, and in most cases it would have fallen heaviest on those least able to bear it. There have been many such instances as this and no banker should hesitate to loan a reasonable amount of money to these companies where there is a good chance of getting it back, realizing full well that if the bank does not, it might suffer a greater loss from the damage and panic which would ensue.

Bankers appreciate the high character of the men conducting public utilities and the many handicaps and great strain they have been laboring under since 1914. Rarely do these men receive from the public proper recognition or commendation, but signs everywhere point to better times ahead for traction lines and other public service corporations. Public sentiment is becoming more and more pronounced in favor of a square deal for them, and rate-making bodies are quick to reflect the public's changed attitude. Managers of utilities and investors therein have reason to expect from now on better treatment at the hands of the public and a return to something like their former prosperity. There can be no general prosperity in the country if the railroads and utilities are not permitted sufficient rates to enjoy a high credit and to give good service. When this condition is brought about one of the principal causes of the present unsettled condition of this country and Europe will be removed.

The Public Has a Moral Obligation

The Author Defines the Duty of the Public Concerning Public Utility Service, with Particular Reference to Street Railways—At No Time in Their History Has This Responsibility of the Public Been More Important

By RICHARD T. HIGGINS
Chairman Connecticut Public Utilities Commission

ANY general analysis of utility problems must be based upon a proper conception of utility service, its character, importance and necessity for the general public welfare.

The organization and operation of a public utility company and any exclusive or special privileges granted to it are primarily for the purpose of furnishing to the people, within the scope of its activities, a necessary public service at reasonable rates, rather than as a business enterprise for the purpose of speculation or large financial profits.

The success of a public utility accrues to the benefit of the general public, as well as to the officers and stockholders. The interested parties in a utility operation are the stockholders or investors, the officers and employees and the general public. A duty and a moral obligation devolve upon all of the parties for the successful operation of the enterprise, which can only be a success by their active co-operation in the faithful performance of their respective duties and obligations. If the parties are antagonistic to each other it is bound to operate to the detriment of the service and to the detriment of their individual and collective interest.

Active co-operation consists in something more than one party telling the other what it should do without defining and trying to fulfill its own proper task. There should be more constructive and less destructive criticism, more intelligent effort on the part of all to perform their respective duties and less tendency to transfer the blame to the other fellow.

The most important and active duties and obligations are naturally imposed upon the utility company, its officers and employees who are in immediate charge of its operation and upon whose efficient management and loyal service in a public enterprise its success must largely depend, and without which its failure is inevitable.

Business enterprises and particularly utility companies are today contending against abnormal conditions and are confronted with many new and perplexing problems requiring strong, broad-gage, business men, familiar with their duties, to shape the policies of the enterprise and direct its operation and, in the case of utility companies, having in mind at all times that the rendition of public service is the object for which the company exists.

It is my purpose in this paper to discuss briefly and informally the duty of the general public in connection with street railway operation. No line of utility service has been more seriously affected by recent conditions or is in a more precarious situation at the present time than street railways.

Space will not permit in this article of an extended diagnosis of all the street railway ills or a specific designation of the partic-

"It is therefore of first importance that state legislatures and municipalities granting street railway franchises enact remedial and protective legislation for the benefit of the great mass of people who use or would use street railways as a means of transportation.

"Failure to give such protection reduces or entirely wipes out the value and importance of a utility franchise and nullifies the legislative intention in issuing the original grant."

ular cause or causes producing the present unhealthy effect. We know that the street railway industry in this country generally is struggling for existence, and unless all parties unite in the co-operative performance of their respective duties many of the companies will be compelled to suspend operation, thereby depriving the people of that particular line of public service.

What are the duties of the general public? They may be summarized as follows: To realize that the operation of a public utility is for its particular benefit and that the rendition of adequate service at reasonable rates depends on its co-operation and patronage; to obtain intelligent information of the financial and other conditions of the utility, its needs and requirements for efficient operation; to afford protection against unwise and destructive competition and to afford relief from unjust and unnecessarily heavy legally imposed burdens, whether in the form of taxation or otherwise, and at all times to exhibit an active interest in the success of the utility as an integral and important part of its own general business.

"Every urban community will agree that street railways are a public necessity and that their suspension or abandonment, notwithstanding the automobile possibilities, would be a public calamity and every student and observer of street railway operation must agree that street railways cannot be successfully maintained if the public service automobile is permitted to operate as a free lance along its lines of road."

It is not reasonable to expect that the individual or unorganized public will voluntarily assume responsibilities or effectively perform meagerly understood collateral duties. The general public must act through its organized bodies, such as legislatures and their administrative branches, municipalities and civic, business and commercial organizations. The positive duty must be in, or the result of, a governmental act.

Street railways are operated by virtue and under authority of special grants and franchises issued by state and municipal governments for the benefit of the people. So long as the particular utility is an absolute public necessity the governmental agencies which created the utility corporation should enact such protective and remedial legislation as will enable it properly to perform its public duty.

The great and important motive power back of any enterprise, whether public or private, is finance, and a utility company without sufficient capital or unable to earn a fair return on the capital honestly invested and required for extensions and betterments, after paying operating, overhead and fixed charges, is not in a condition to render adequate service at reasonable rates.

It may be claimed that the logical conclusion is to increase the rates to a point necessary to produce the required revenues, but in the case of street railways the expensive collateral statutory burdens, the competition of unregulated and less burdened transportation agencies reducing the volume of street railway business and the more or less unresponsive attitude of the traveling public, such an increased rate is liable to become a prohibitive rate, resulting in decreased rather than increased revenues.

It is therefore of first importance that state legislatures and municipalities granting street railway franchises enact remedial and protective legislation for the benefit of the great mass of people who use or would use street railways as a means of transportation. The particular legislation would depend upon existing state and local conditions, but in general should involve relief from unnecessarily heavy taxation based upon corporate value or gross receipts without regard to net revenue; relief from the imposed duty, at present existing in many of the states and communities, requiring street railway companies to construct and maintain a large portion of the public highways and bridges for the special benefit of other users of the highway, including competitors, and protection against unfair and unauthorized competition in its occupied territory. Failure to give such protection reduces or entirely wipes out the value and importance of a utility franchise and nullifies the legislative intention in issuing the original grant.

The extent of protection and the restrictions, obligations and limitations imposed upon the competition must to a certain degree depend upon public sentiment and the public necessity for a continuance of street railway service. If street railways are no longer an absolute necessity it is because the automobile in its various forms and classifications has taken their place and is rendering or able to render short-haul passenger transportation service adequate for public needs, satisfactory in character and at reasonable rates, under all climatic conditions.

While privately owned automobiles have naturally affected the volume of street railway traffic, the only class that can be considered or controlled in connection with street railway problems is the jitney or automobile bus, carrying passengers for hire. This mode of conveyance is meeting with considerable popular favor and has become an important factor in both urban and suburban transportation.

Motor Bus Has No Place as Competitor of Street Railway

I believe the jitney or automobile bus has a legitimate place in supplying public transportation service, but not on the lines and territories served by and in direct competition with street railways.

Every urban community will agree that street railways are a public necessity and that their suspension or abandonment, notwithstanding the automobile possibilities, would be a public calamity, and every student and observer of street railway operation must agree that street railways cannot be successfully maintained if the public service automobile is permitted to operate as a free lance along its lines of road.

The unrestricted and unlimited competition of automobile service would also have a tendency ultimately to destroy its own efficiency and self-supporting earning power.

Before throwing electric street railways into the discard by permitting gasoline street automobiles to usurp their place, the public should consider carefully the consequences and the adequacy, dependability and permanency of the substitute service. There is a constantly increasing demand and supply of electricity for power

purposes, and if in the next few years the present reports of the limited supply of oil and gasoline should be fully realized we might find that gasoline in sufficient quantity could not be obtained, or its price might be so high as to prohibit its use as the motive power for public service automobiles.

If we permit or compel the discontinuance or abandonment of street railway service and later discover that we are without adequate or practical service to take its place it will take millions of dollars and years of time to rectify the mistake. It should be forestalled by proper legislation at this time.

The powers and discretion conferred upon public administrative tribunals should be so exercised as to assist as far as possible in maintaining the utility at its maximum efficiency. If necessary to increase rates the rates should be increased before the company becomes financially embarrassed and the property allowed to deteriorate. Deferring maintenance is not only an expensive but a dangerous policy to pursue.

Street railways, if they are to continue serving the public, need assistance, and that assistance cannot be rendered in the form of punishment or antagonism; they need the active, friendly and intelligent co-operation and assistance of the public through its business, commercial and civic organizations. It is incumbent upon these organizations to become informed upon this line of public transportation and its necessity, needs and means of relief. Public sentiment is a controlling element and public sentiment should be formed by intelligent information which these organizations can obtain and disseminate.

The Responsibility Is on the Public for the Maintenance of Good Service

If enlightened public sentiment demands jitney or automobile bus instead of street railway service it means the decline and ultimate abandonment of street railway service, excepting in large metropolitan centers, and a tremendous financial loss to present investors in street railway securities. This is a question the general public will have to decide, and it is extremely important that it decide correctly and with a full understanding of all the facts.

In any event I believe that automobiles carrying passengers for hire should come under public regulation as to rates, service and schedules, not only for the protection of the traveling public but for the protection of their own industry and investment.

There are many legitimate uses to which our public highways may be subjected, and it is essential that no one use be permitted to so dominate or congest the streets that other legitimate users will be debarred from access to or safe utilization of such streets.

At no time in the history of street railways has so important a responsibility rested upon the public—the responsibility of determining whether street railway service shall continue or terminate.

In conclusion, I will quote from a recent decision of the Public Utilities Commission of Connecticut: "From an analysis of the history and development of street railways the commission is led to the conclusion that even though the motive power may change, as it has in the past, the essential features of a street *rail* way will remain. For more than seventy-five years street railways have operated along a predetermined course, on *rails* or tracks, with every new form of motive power."

Hostility of Public Often Due to Misunderstanding

Claim Agents Are in an Excellent Position to Keep Informed of Public Feeling—Employees Should Be Taught to Boost

By R. E. McDOUGALL

General Manager New York & Harlem Railroad, Surface Lines, and Past-President American Electric Railway Claims Association

ELECTRIC railways have gone through some hard, lean years, and while other lines of business and the men connected with them have prospered financially, most of us find ourselves not as well off as we were five or ten years ago. It goes without saying that this is because of the financial condition of our respective companies. For years past it has been a popular game to knock the electric railway. All sorts of fiction concerning them has been circulated and allowed to go unchallenged.

No other public utility should be permitted to lead the electric railway in the community it serves, and if the company's employees are boosters for their company no other utility will lead. If the men who get their bread and butter from a company do not boost for it and try to make it popular and successful no one else will.

No employee of an electric railway is better informed as to how his company stands with the public than the claim agent and his representatives. If any soreness or grievances exist against his company the claim agent is sure to learn of it as quickly as any other. He and his men are in close contact with the public and complaints are continually being made to them by the road's patrons on all manner of subjects, such as service, equipment, conduct of employees and conditions in general. He has every opportunity to learn the reasons for any such feeling and usually finds that it is due to petty annoyances, such as service interruptions, incivility or discourtesy on the part of employees, failure of the company to fulfill promises regarding little things that have been called to its attention, etc.

From such contact with the public, the claim man sooner or later comes to the conclusion that the company's standing and many of its troubles are due largely to indifference of its employees, and many times of its officers, as to what the public thinks or wants. He finds that the people who are generally boosters for community advancement are often against the railways and take no interest in the electric railway situation and know very little about it. They are knockers because they have no knowledge of the facts. When acquainted with the actual conditions they are quick to grasp the situation and willingly stand up for the company and champion it when in the right.

The claim agent realizes that in the past company officials and employees were too busy with other matters to seek the good will of the public, and, in consequence, the public has become unfriendly. The good will of the public must be secured if electric railways are to take their proper place in the business life of each community served. This can only be done through the united effort of the railway men themselves.

The Interests of the Railways and of the Manufacturers Are Identical

Their Common Interest Should Lead to Co-operation—The Pendulum of Public Opinion Now Swings in the Proper Direction—Manufacturers and Railways Must Rise Together

By CALVERT TOWNLEY
Assistant to the President, Westinghouse Electric & Manufacturing Company

BECAUSE a large percentage of contact between street railways and the manufacturers has to do with the purchase and sale of apparatus, material and supplies, in which there is ever present the inevitable discussion of prices, an important fundamental fact is frequently forgotten, namely, that except in the matter of price for the manufacturer's product, the interests of the railways and of the manufacturers are identical in every respect. Prosperity to the railway means prosperity to the manufacturer. Adequate service from the railway means improved labor conditions for the manufacturer. A high standard of product from the manufacturer means reliability of service to the railway.

The electrical manufacturer is in general one of the substantial industries in his community and as there is always a trolley company serving that community their common interest should uniformly lead to co-operation which will frequently prove very effective.

"Prosperity to the railway means prosperity to the manufacturer. Adequate service from the railway means improved labor conditions for the manufacturer. A high standard of product from the manufacturer means reliability of service to the railway."

A large per cent of the street railway troubles of the past have arisen from ignorance of or indifference to the street railway problems on the part of the public, where the active interest of even one prominent industry would have materially helped the situation. This sort of co-operation, local and direct, has not been availed of in the past as fully as it might have been. In fact, the opportunities for it have been more or less neglected in favor of general co-operation in national matters through our national organization, but the opportunities that offer are pregnant with possibilities.

The old saying that "it is always darkest just before dawn" has been again confirmed in the street railway industry, as might have been expected, and through long continued energetic effort the pendulum of public opinion now seems to be swinging in the opposite direction. It was natural that following the old horse car days the transformation to electric propulsion and the rapid expansion of city lines, coupled with the building of interurbans, focused public attention on the magnitude of the industry and on the large profits, real or imaginary, which the promoters of trolley transportation were making, while the accompanying benefits to the communities served were either minimized or, being taken as matters of course, were lost sight of. It has only been by the repeated presentation of many severe object lessons of actual or threatened discontinuance of service that the value of trolley transportation to a community has begun to be recognized, so that instead of having to go on the rocks or receiverships, there seems now to be a reasonable expectation that the companies will be allowed to earn sufficient revenue to pay their operating expenses and charges.

Speaking in the language of our golf enthusiasts, a big bunker was cleared when the street railways got away from the 5-cent fare, which at one time seemed to have been established about as firmly as the laws of the Medes and Persians. However, there is much yet to be done before the industry will again be on a sound basis, and there must be no letup in the united effort of all interested parties if we are to reach that goal. In the first place the deep-seated and erroneous impression held almost universally by the public that a franchise is a valuable asset contributed by the public must be dissipated. Under the conditions prevailing when the street railway industry was started, namely, perpetual franchises, no regulation, unrestricted issue of securities and fares fixed by the railways themselves, such franchises were assets of great value, but under the present condition, reversing all of these specifications, a franchise is a liability. Because an unprofitable street railway can neither move away nor shut up shop its franchise is a burden which a private industry does not have to bear, and as compensation for the assumption of such a burden by the utility there must be a counterbalancing asset if the business is to be economically sound. Just what form this asset should take is open to debate, but as the burden of liability caused by the franchise is one imposed by the public it would be reasonable to have the corresponding asset likewise supplied by the public and thus might take the form of definite laws which should clearly put upon the regulating commission the duty of establishing such fares as may be necessary to insure security for the present investment and to attract new capital when necessary.

Just as it has taken a long time to get away from the nickel fare so will it take a long time to eradicate the misleading ideas about the value of a franchise, and this only emphasizes the necessity for continued co-operation between railways and the manufacturers.

I am one of those who believe with Thomas Jefferson that "that nation is governed best which is governed least." I am distinctly opposed to paternalism and believe that the government should keep its hands off industry and allow the free play of the natural laws of trade. In confirmation of this view it is an interesting commentary to note that, during the past few years, when abnormal and in fact unexampled prosperity has prevailed throughout the land in all unregulated industries, our transportation corporations—regulated industries—have been starving to death. I therefore main-

tain it to be an obvious conclusion that while none of us expects the principle of regulating public service corporations to be abandoned, it is cowardly not to face the facts, and it must be admitted that as it has been practiced regulation has failed.

In discussing the possibilities of co-operation by the manufacturers, it is sometimes suggested that one form it might take is a reduction of the prices of their products. Looking at the matter from the standpoint of a street railway operator, it is my judgment that although this is a natural suggestion, it is a mistaken one born of a desire to economize and of the same parents as are the objections offered by municipalities to the payment of an adequate street railway fare. Any one who is familiar with large commercial enterprises and who investigates the matter will have to admit that the profits on electrical products are relatively small as compared with those of a major per cent of other comparable industries. To throttle the electrical manufacturers as the street railways have been throttled, by bringing pressure to bear to reduce their already moderate returns, would be to cramp development and encourage stagnation. If any change at all were to be made I believe it would operate to benefit the street railway companies if manufacturing profits could be increased, although under the prevailing severe competition it is quite unlikely that such an increase will occur—and so far as I know no one seriously expects it.

The writer began his connection with the manufacturing industry more than thirty-two years ago and during the intervening time hardly a year has gone by that it has not been proposed to "standardize" apparatus. Some one has announced that we have now reached a period when little further progress can be expected and therefore standardization is in order. The absurdity of such a policy will become evident to any one who will take the trouble to review the forward steps that have been made from year to year in the production of improved machinery and appliances, without which the street railway industry would today be in a very much worse condition than it is. Of course this does not mean that there should be no standards, but these should be limited to the dimensions of obviously essential parts and also to such electrical characteristics as methods of rating, of testing and other subjects such as are treated in the standards of the American Institute of Electrical Engineers. There should be the utmost freedom allowed in design so that the industry may reap the benefits of all advances in the art.

In general, it is fair to say that the trolley outlook has improved over what it was a year ago and the prospects for still further and greater improvement are encouraging provided that every effort possible be continued and that the closest and most efficient team work between the industry itself and the manufacturers be systematically promoted.

Stores Service Has Unrealized Possibilities

A Vital Element of an Operating Company, Generally Overlooked—Real Organization Allows Department to Function Properly and Be of Great Service

By M. T. MONTGOMERY
General Storekeeper for the Receivers, Pittsburgh Railways, Pittsburgh, Pa.

THE railway systems are up against it in every way and it is time every department and every man in the industry pulled together toward better conditions. Some of the departments have been forced to improve their methods because they were directly concerned with transportation and everybody was watching for a chance to jump on them, while we of the stores department have always been considered incidental.

Now is the time for the stores department to show what it can do—the whole industry is howling for materials, cost reductions and labor saving devices and our department, it seems to me, is the one that affords the transmission to make things go. In past years, with normal markets and easy money, it was not necessary to invest money in large stocks or worry about deliveries or material substitutes, but now—well, you know conditions without any more talk, and since purchases are based on stock on hand in our department we are always mixed up in the troubles.

Let's make up for lost time and show what our department means to the railway industry. The industry supports us, so it's only right for us to be selfish enough to help support it through efficient service.

Headwork and co-operative effort can accomplish a great deal, and in the line of head work we should start with a concise plan for our department by which to give service and regulate materials and supplies in spite of "no stock on hand," which, like the poor, we have always with us. We can measure our progress by the reduced number of refusals from material supply houses.

Locally our "Stores Department Calendar," shown below, is the concise plan by which we work, and with it and a pull together, we hope to accomplish wonders. Without going into detail I will outline a few "high spots" in our plan and its working.

Aim—Service

- Care and delivery of materials when and where required.
- Removal of all surplus materials and scrap
- Keeping tabs on progress through cost of operation.

A—STORING

- Location of stores and yards.
- Physical arrangement of stock. Consider.
  - Bin layout
  - Maximum visibility
  - Packaging
  - Proper piling
  - Cleanliness
- Division of stores into sections in charge of stockmen
- Responsibility concentrated
- Inventories
  - Monthly stock counting
- Short Cuts
- "Labor Savers"
  - Everything potentially on wheels
  - Steubing lifting trucks—Platforms
- Portable elevators
  - Sprague electric hoists on tracks
  - Barrel racks
  - Locomotive crane
  - Street crane
  - Gravity carrier — Roller coaster
  - Ballast ships
  - Cement sack baler
  - Counting scales

B—RECEIVING

Individual receiving cars
Description tags
Testing—Rejections
Material not O. K., put in "disposition room," pending adjustment
Freight bills

Short Cuts

"Labor Savers"
Stenciling machine
Electric branding iron

C—ISSUING

Car supply schedule
Exchange sheets—one old for one new part
Filling requisitions simultaneously
Analysis of unfilled requisitions—daily
Hurrying materials
Following up hurries
Manifesting
Every shipment checked before delivery
Issuing material over counter for shop use.

Short Cuts

"Labor Savers"
Fanfold manifesting machine
Color tabs for follow ups

"Stores"

D—ACCOUNTING

Stock books — perpetual chart of performances
Errors localized
Price record
Cost accounting
Shop orders

Short Cut
Accuracy

E—PICKUP

In conjunction with the operating department conduct semi-annual pickup trips to every point where material is handled and turn back into stock all usable or repairable materials. This activity is in charge of men representing the stores and operating departments. These pickup trips include the collection of scrap as well.

F — OBSOLESCENCE

Go over stock twice a year and dispose of items which became obsolete through change of design or equipment by sale or scrapping.

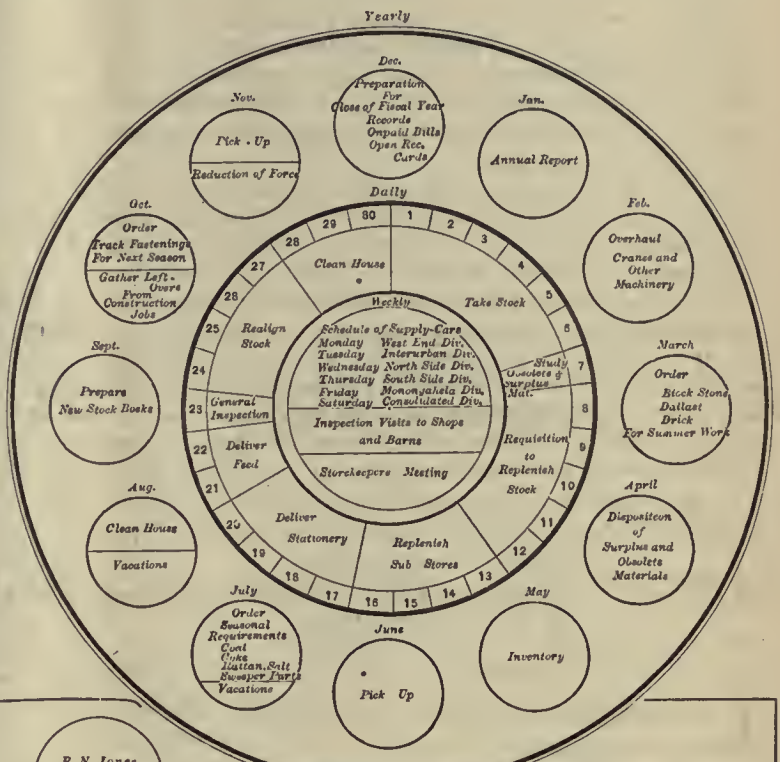
G—SCRAP

Put non-ferrous scrap in crucible shape. A scrap dock for ferrous scrap is located in our railroad yards.

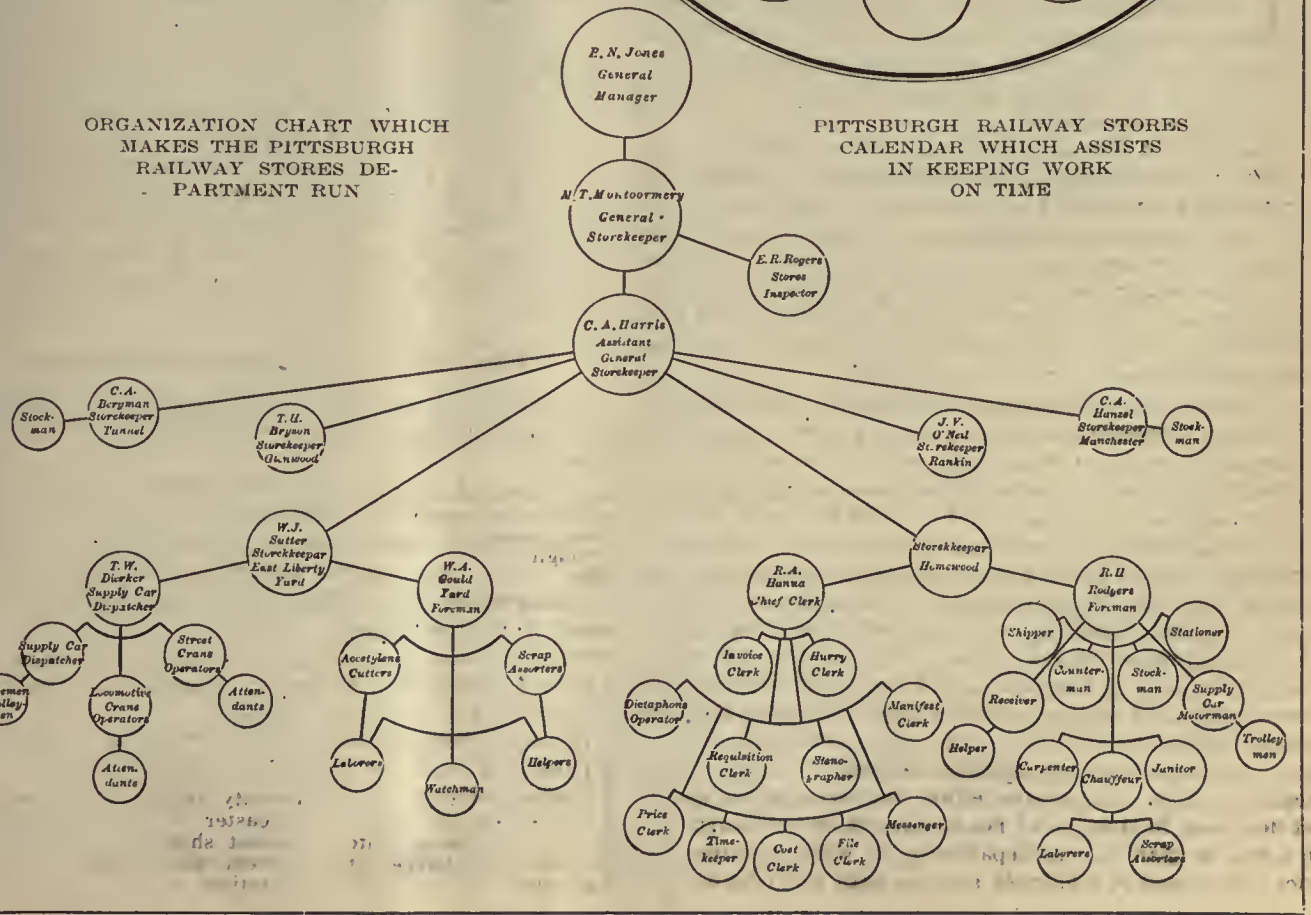
Short cuts

"Labor Savers"
Scull cracker
Alligator shears
Oxyacetylene cutting outfit

While after all the success of any undertaking depends as much on the planning of the work as the headwork of those doing it, without co-operation success will not be achieved. We also groom our boys for bigger jobs, helping them to look ahead. We give them incentive to do just a bit more than they are paid for and we share our responsibilities with them. We look to them for suggestions and these are discussed. If credit belongs to any one of our force he gets it. Our organization—see chart herewith—is flexible. Merit is



ORGANIZATION CHART WHICH MAKES THE PITTSBURGH RAILWAY STORES DEPARTMENT RUN



PITTSBURGH RAILWAY STORES CALENDAR WHICH ASSISTS IN KEEPING WORK ON TIME

always recognized and the ambition of all those of our forces is fostered, helping them to achieve still better results. The stores department, being in close touch with all its brothers, needs co-operation. We found great help in exchange of ideas at storekeepers' meetings and daily shop visits. We aim to see each foreman and listen to his story. Personal touch is just as important in our line of business as in salesmanship. Our craft should get a boost through the proposed section of the A. E. R. A. and by exchanging ideas be mutually benefited.

Each road has its own problems and peculiarities, which are more or less details, but the main issue—the procuring and handling of materials—causes us in our properties perhaps less trouble than in most others, because we work according to a prearranged and concise plan and our stock books.

During these troublesome days, when shipments are overdue and the markets uncertain, it is more than ever necessary to have a record showing actual rather than theoretical conditions, based on ledger or card entries.

We find our stock books and calendar our panacea for all ills which may befall a storekeeper.

Let's Dig Ourselves Out

The Engineer Can Do Much More with His Tools—Engineers Must Also Exchange More Intimate and Detailed Experiences

By R. H. DALGLEISH
Chief Engineer the Capital Traction Company, Washington, D.C.

THE editorial in the June 19 issue of the ELECTRIC RAILWAY JOURNAL "We Are in Our Own Pit; We Must Dig Ourselves Out" expresses the condition confronting every engineer and equipment man in the electric railway field today.

Conditions generally have been bad and hard to master for some time, but now they are getting better and can only improve in proportion to our effort to improve them. There are several ways to improve conditions, but the most important way, in my opinion, is the use of labor-saving tools. A careful study made to determine where labor-saving tools can be used to the best advantage is one of the most important jobs for the engineer today.

The mere installation of labor-saving tools, however, does not complete the work of the engineer, but he must see that they are operated in such a way as to get the most out of them. I know of a few cases where expensive labor-saving tools have been installed and then so poorly handled that less than 50 per cent of what they were capable of doing was got out of them. It was quite true that this 50 per cent was better than had been done without labor-saving tools and seemed to satisfy the engineer in charge. Most of us have a few labor-saving tools and some of us are well equipped, but are we getting out of these tools all that it is possible to get out of them?

The proper use of labor-saving tools is as important as installing them, for there are few cases where a study has been made of these tools that it has not resulted in increased production.

The welded rail joint is another item that should not be overlooked by the maintenance man today. We all know the life of the track depends on the joints and with welded joints this life can be greatly increased. Loose joints are also eliminated, as is also the expense of continually tightening them. So much joint welding has been done in the past few years that there is considerable information available on this subject. I have found that regardless of the type of welded joint used the success of the joint depends almost entirely on the workmanship. It is therefore important that this work be carefully inspected before the paving is laid in order that the workmanship may be kept up to the high standard required for this class of work.

We do not find many engineers today who are reluctant to give information about the results obtained in their work, but sometimes they do not take the time to go into detail enough to make the information of the most value. Now is the time for the engineers to get together and find out what the other fellow is doing and tell him what you are doing.

There is an opportunity for the manufacturer, also, to help the equipment men by the standardization of the wearing parts of equipment. I fail to see the necessity for the absolute lack of interchangeability of the wearing parts of motors produced in the past few years. This one situation necessitates carrying in stock wearing parts for every type of motor used on any property, few of which can be used on any two types of motors even of the same horsepower.

We are told that standardization of motor parts will hinder the development of new motors. I do not agree with that, but feel that if a serious attempt were made to standardize much good would be accomplished. It would of course be necessary for the equipment men to use the standards and not require special apparatus built to meet their particular needs.

The ELECTRIC RAILWAY JOURNAL is doing a great deal of good for the industry in the articles appearing in each issue of particular interest to the engineer. These articles frequently show improved methods of doing work that is well worth considering. Frequently work is done a certain way because we are in the habit of doing it that way, but it is not necessarily the right way. It would therefore seem that the important thing to do today is to find out if your way is the right way, or merely the way you have been in the habit of doing things.

The Influence of Facts and Figures

A prominent electrical railway manager in a Western state, under date of July 3, writes to the publishers of this paper as follows:

"Though I am often struck by the exceptional merit of articles appearing in the ELECTRIC RAILWAY JOURNAL, I have seldom taken the trouble to tell you my good opinion of them, but the editorial in the June 26 issue entitled 'Facts About Figures—Figures About Facts' is really a little gem.

" 'History may be history, but as between the romanticist and the realist, we choose the romanticist. Facts untouched by art make dull reading.'

"I really believe that if the story of street railways during the past ten years had been consistently told by street railway executives with the thoughts you have expressed here as guides, the street railway industry would have escaped most of the troubles that have been so heavy upon it."

The Future of the Electric Railway

Interurban Roads Must Develop the Maximum Freight Business—The City Public Must Determine for Itself If It Wants Low Fares or If It Will Continue to Pay Some of Its Taxes Through Railway Fares

By E. G. LEWIS
Chairman Indiana Public Service Commission

THE war and the disturbed financial and economic conditions which have followed in its wake have created a most trying condition for the public utilities. This is particularly true for (1) central-station heating plants, (2) interurban and street railways, and (3) gas utilities, in the order stated. The increased costs of coal and labor, if the upward trend continues, must result in a great number of central-station heating plants being abandoned. Three such in a total of seventeen have been abandoned in the State of Indiana during the last year and two more petitions for abandonment are now pending.

The gas situation has been made especially acute by the extension of the automotive industry, with the result that the owners and operators of 8,000,000 motor-driven vehicles, to say nothing of other gasoline and oil-driven engines, are bidding high prices for oils which are essential to the production of gas. This situation may be met without serious difficulty, although it calls for radical readjustments of rates for gas which even a year ago could not have been predicted.

It has been prophesied that similar readjustments will have to be made in water, electric and other utilities. This brings the consideration of serious conditions to the street and interurban railways.

Taking the interurban railways first, Indiana has been conspicuous as one of the important interurban railway districts of the country. It is difficult to forecast their future. The main lines of passenger and freight traffic in this part of the country were originally marked by the old stage routes. These were later paralleled by the steam roads, which gradually replaced the stage lines and primitive trucking facilities. In the period 1890-1905 these steam roads were paralleled by electric interurban lines, which in turn took the purely local passenger business of the steam railroads. Because of the large bulk of this business and the low operating costs in the matters of labor, coal, etc., the passenger business was sufficient to meet the revenue requirements on these lines of distribution, and very little, if any, attention was paid by these companies to the possibilities of freight business, although there was a development of what might be termed fast local freight and express. Now we see these lines being paralleled again by concrete and brick highways, constructed under state and federal aid, and in addition the advent not only of the passenger vehicle but also that of the truck, with its development from a single unit to multiple units.

It has been the theory of the Indiana commission, in which most of the Indiana interurban officials concur, that probably the greatest amount of revenue was to be obtained by keeping interurban passenger fares a fraction below the fares of the competing steam railroads; that is to say, while the steam roads have been operating on a 3-cent fare, the Indiana interurban roads have been content until very recently with the 2¾-cent fare. The coal shortage, which began with the miners' strike in November, 1919, and which was brought to a most acute stage in the spring of 1920 by the unauthorized but nevertheless far-reaching strike of the trainmen, forced the price of coal to unprecedented heights. This fact, together with the continued upward trend of wages, placed the Indiana interurban roads under the necessity of abandoning all ideas of continuing the original ratio of passenger fares. The result is that within the last two months a number of them have knocked at the door of the commission with a request to have fares placed on an equality with the competing steam railroads. Showings are such that the 3-cent fare will undoubtedly prevail generally. It is the opinion of interurban men and commissioners who have studied the interurban problem that such lines may not profitably exceed the competing steam railroad fare. If the latter remains at 3 cents and costs of coal and labor continue to mount, and at the same time local traffic, both passenger and freight, turns away from the interurbans to the new state and federal highways, certainly the future of the interurban railroads does not look promising.

There seems to be but one avenue open for development, that is increased freight business. This calls not only for aggressive policies on the part of interurban railroads, but in such large cities as Indianapolis, Evansville, Fort Wayne, etc., it calls also for certain reconstructions which will permit the hauling of longer and heavier freight trains into and out of cities. It remains to be seen whether the large terminal cities and the smaller ones through which interurbans pass will permit the development of such interurban traffic along freight lines as might be successfully carried out over a period of years. For example, there is before this commission the insistent demand on the part of buyers of live stock that the interurbans transport their hogs and cattle to stock yards. This, however, would necessitate the operation of live stock cars through some of the best residential districts of the terminal city and also through the residential and business streets of numerous towns and cities lying between the point of shipment and the stock yards. The same problem attaches itself, in lesser degree perhaps, to the operation of trains made up of box cars.

"The problem in this State is whether the time has not been reached when cities must decide, largely for themselves, whether they want low fares or not. The question is to be answered finally by the determination whether the street railway shall be subjected to the heavy costs of maintaining paved streets or whether this burden shall be placed on the taxpayers as a whole."

The unfavorable financial condition that confronts the

whole electric railway industry is such that the companies themselves have not been able to feel certain of competent expenditures to meet the conditions herein set forth. If the interurban railroads are to engage also in extensive freight business there must be constructed enlarged terminal freight houses, a situation that is most acute in the city of Indianapolis, where the development of interurban freight business is now being hindered by the inadequacy of the loading and unloading facilities of the freight houses.

In dealing with the interurban problem local conditions have in general been discussed. However, Indiana problems must be typical of those in most interurban railway systems throughout the country.

"As for the future of the street railway, it is bound to go on. No matter what the fare may be, it must operate."

The street railway situation, of course, presents one of the most critical utility problems that the country faces today. It is critical not merely from the single viewpoint of revenues but also because of the absolute necessity of cities having transportation facilities that are adequate to handle the masses of people. From coast to coast, speaking generally—though there are exceptions to the rule—the street railway industry is in the hands of a receiver or immediately at the door of receivership. Still the street railway must go on; it has to operate or cities die. It comes next to the water supply in the ranks of those utilities most vital to the public, with the possible exception of the central-station electric power plants which drive the wheels of industry.

It is possible that the last two or three years have seen the breaking down of the psychological opposition to a fare higher than 5 cents. There is, nevertheless, to be considered the economic condition that prevails in the matter of higher fares. The higher the fare the more certain will larger numbers of people, whose pocketbooks are cramped by increased cost of living, deprive the street railway of its most profitable business by walking short distances.

For several good reasons we have not been as close students of local street railway problems as some other commissions have been. Supplies of steam coal have been near at hand and other conditions have been very much in our favor. The result has been that the street railway problem in Indiana has not become so critical as in some other sections. The commission and the utilities have been able, therefore, to maintain the 5-cent fare pretty generally. In districts such as those bordering on Chicago and including the city of Gary it has been necessary to go to the 6-cent fare and to adopt certain zone systems. A 6-cent fare with a 5-cent ticket has been put into effect at Evansville. Otherwise the 5-cent fare prevails. The commission and the traction officials themselves have accomplished much in the way of financial rearrangements. This has been notably the case at Fort Wayne, Indianapolis and Evansville, where considerable amounts of securities which did not represent property investment were eliminated. In addition there have been set aside for temporary purposes certain sinking funds. This, however, has not been accomp'ished without providing that the money which was apportioned to sinking fund reserves represented expenditures for plant improvements, with the result that security holders have not been placed at a disadvantage.

The problem in this State is whether the time has not been reached when cities must decide, largely for themselves, whether they want low fares or not. The question is to be answered finally by the determination of whether the street railways shall be subjected to the heavy costs of maintaining paved streets or whether this burden shall be placed on the taxpayers as a whole. In some localities the vital question is that of gross income and the determination of what taxes, if any, shall be paid out of the earnings of the company to the city treasurer to relieve the general tax burden. It is probable that these matters may have to be brought to the attention of the Legislature before cities can assume such obligations, which, in the past era of street railway transportation, have been thought to be properly assessed against the street railway. The proposal has been made that the commission might continue the straight 5-cent fare under an agreement that the city pay out of its general fund ½ cent for each passenger carried, making the gross realization of the utility 5½ cents. It was thought that inasmuch as the patrons would pay only 5 cents it might result in as much increased revenue as a 6-cent fare would produce. This proposal was, however, found to be not in compliance with the state law.

We have been especially fortunate, speaking in general terms, in improving the street railway conditions, particularly in Indianapolis, during the war and post-war periods; that is to say, the service in most cities is at least as good as it was before the war, and in some cities it has been improved and in a measure has kept up with the tremendous advance and growth in population.

The war has had one very beneficial effect that may have lasting financial results. The street railway companies have been liberalized to a very considerable degree in the matter of their attitude toward the public. With the changed attitude on the part of these public servants it is very probable that the general conditions, at least in this city, will materially improve and that the street railway managers as well as the public will have learned a great deal with regard to each other that they would not have appreciated had it not been for the ordeal of war.

As for the future of the street railway, it is bound to go on. No matter what the fare may be it must operate. It remains to be seen whether increased fares will result in municipal ownership of these street railways. The results in Seattle and other cities which have municipal street railways may be seized upon by both sides—those in favor of and those opposed to municipal ownership.

For the former there is the argument that the fare until recently was 5 cents. For the latter there is the argument that with a 5-cent fare the taxpayers of the city of Seattle last year paid approximately $500,000 for expenses that under private ownership and operation would fall to a much lower level.

The public has the choice of paying a higher fare directly or indirectly through increased taxes, but the economic condition is a fact and must be faced frankly if transportation is to be maintained.

Waiting for a Miracle to Happen?

The Problems of the Electric Railway Engineers—Need to Get Out of the Rut Well Pictured—Their Proper Attitude Toward the Industry, and Twelve Salient Suggestions for Constructive Action Set Forth

By EDWARD A. WEST
General Superintendent the Denver Tramway Company

TO THE man trained to build, improve and better things the present condition of the street railway apparently is a hopeless situation, a veritable "slough of despond."

In general, what the street railway engineer is confronted with is:

1. Inability to make necessary renewals.
2. Materials away out of sight; deliveries the same.
3. Labor high, dissatisfied, scarce, inefficient.
4. High cost of capital, and not available for additions or betterments.
5. Attacks on the ability of the profession by uninformed individuals.
6. Throttling of the industry by rigid rate structures.

That the physical condition of most street railway properties is gradually being lowered cannot be denied. Replacements, renewals and even certain items of ordinary maintenance have been deferred. Sensing this condition has had a bad psychological effect on the trained engineer.

Watching material costs soar and listening to excuses from manufacturers regarding failure to deliver demoralize work schedules and tax experience and judgment to the limit. When to buy and how much is a problem. Are costs going higher or coming down?

It has been stated that labor under normal conditions is only 66⅔ per cent efficient and that now its usefulness is only 50 per cent of normal, which means 33⅓ per cent with a cost of 100 per cent greater than normal. Add to this condition a defiant attitude, a deliberate and studied "don't care" position, continual presentation of grievances, real or imaginary, with a constant threat of a cessation of work, and you may know that the man trying to get things done is certainly handicapped.

The watchdog of the treasury trims every estimate, forces the adoption of substitutes and alternatives. Betterments a few years ago were approved upon a showing of 10 per cent saving. Today the engineer must show 25 per cent or better in order to get the wherewithal to do a job. "Build for permanency" has become a dead language and lies on the shelf with "What'll you have, gents?"

The foregoing troubles not being enough, the engineer has had to answer charges of "overvaluation," "excessive costs" and "past extravagances" brought by people trying to keep fares down to pre-war standards.

The engineer is requqired to explain to lawyers and investigating bodies, over and over again, the reasons certain things were done. He has to listen to hindsight critics tell how it could have been done differently, and on the witness stand is made to admit that certain things could have been done differently and at less cost. Before he can explain the reason for the thing as it is he is choked off by a smart-aleck lawyer.

The effect of a rigid rate structure permeates the entire organization, but in the engineering department it probably finds greatest expression, for when the economy tension spring is tightened maintenance is the first to be squeezed.

In view of the above, and the many other unsatisfactory things daily confronting him, is it any wonder that the engineer looks upon the street railway situation as utterly hopeless?

Could a general in command of an army on a battle field do a good job of commanding if he was back of a rifle down in the trenches?

Can we help the general situation any by grumbling, grunting and gaffing?

That much-advertised and well-known law "supply and demand" has taken labor and material matters into secret session to which we are not admitted. We can guess what is going to happen and find little solace in such reflection.

We can sit around and condemn rate regulating authorities to the everlasting bow-wows; we can attend nice, orderly technical engineering meetings and resolute ourselves pink-eyed; we can explain away everything that happens. But does all this avail us anything, do we feel any happier with our lot, do we like our job any better?

Men, we will have to get out of the rut. Engineers are continually faced with impossibilities, failure was left out of the engineer's handbook. *It can be done.*

General Attitude Toward All Industry

Complacent acquiescence with things as they are is much better than getting your mouth sore champing at the bit. We may be having our troubles these times, but there are mighty few industries of any kind that aren't. We see our trials and tribulations on the front page of our morning newspaper and go around the rest of the day believing every one down on us. We meet an acquaintance and he hands us a bunch about watered stock and overvaluation.

A short time ago a group of men were seated around a table discussing general subjects. There were present a retail florist, a manufacturer of white goods, a public official, a boiler works sales engineer, a realty agent and a public utility engineer. As usual the conversation covering general topics became a lively experience meeting. The whole gamut from the A. F. of L. to official Washington was disposed of. Then present day costs occupied the floor. The real estate man, a gay bachelor, started things by jumping on the florist for having increased the price of cut flowers, the florist jumped back with interest because the rent of the apartment he occupied had been raised more than 80 per cent. After much heated discussion the realtor and the florist buried the hatchet. Then the public official present said the real profiteers were the department store owners. The armistice was declared off, the hatchet exhumed. The manufacturer of white goods took the occasion to answer Mr. Public Official's charges. With the aid of a notebook full of statistics the manufacturer

proved that dry goods merchants were the most philanthropic business men extant; that the net of department stores was only one-half what it was before the war. (He was talking percentages and not dollars and cents.) Each and every man present up to this time in the controversy proved conclusively, to his own satisfaction at least, that his skirts were clear and that his kind were a much-maligned lot. The discussion in all its details was of more than passing interest to the public utility engineer, and when the opportunity presented itself he ventured the remark "that his business was affected by the same economic questions as the business discussed."

Did he get a respectful and attentive audience? He did not. The florist, real estate man, manufacturer, public official, all except the boiler man, jumped on Mr. Engineer with gusto and éclat. "The utility business was different;" "it was a public service industry;" it operated under a franchise which fixed the rates to be charged." Vainly did the engineer try to reason; his arguments were overruled; the history of his company was common knowledge to all present (they admitted it). Hadn't the utility company some twenty years back advertised its tremendous profits in order to sell bonds? Hadn't it bought its own franchise (and incidentally the City Council)? Finally, after several attempts, the engineer got his story across and had the satisfaction of hearing one after another express their ignorance of the real facts. Each man present finally agreed that the same kind of disease was attacking all business and that knocking each other would not help matters any. The boiler man, who had listened attentively to the entire discussions, got up from his chair and said he was about to retire; before actually doing so he expressed himself as having been greatly interested in the evening's discussion, and added that it had been extremely instructive. As the boiler man said "Good night" he remarked that the entire discussion brought back to him the force of the old saying, "There is so much bad in the best," etc.

The boiler man is right. What's the use whining? The other fellow is having his troubles, only we don't know so much about the details of it as he thinks he does about ours.

Waiting for the Miracle to Happen

Some of us lean back and sigh, then utter such startling and extraordinarily original statements as:

"The present conditions can't last, they've got to change."

"A panic would do the country good and it's bound to happen before long."

"Let's be patient until things return to normal."

"What's the use trying to do anything these days, with labor and material out of sight."

Etc., etc., *ad infinitum* and ditto, ditto.

Evidently we are waiting for an earthquake, thunderbolt or the bottom to suddenly drop out. Will it?

If there is one thing an engineer should know it is everything that the old saying "Rome was not built in a day" means. While our administrative officials are struggling with financial problems and our operating officials with labor troubles the engineers resignedly wait. Wait for what?

If we are waiting for a day to dawn with the tension absolutely removed we are doomed to a long, slow wait. Think it over. We can't build a bridge of any magnitude overnight; even the least experienced realize this. What will happen will occur so gradually that its start and finish will be as indistinguishable as the beginning and ending of $y = a_1 \sin x + a_2 \sin 2x + a_3 \sin 3x + \ldots\ldots$ to n terms.

The day will arrive when we will sense relief, construction and rehabilitation will be under way, long-deferred maintenance jobs will be behind us. Our operating brothers will again find fault with the snail's pace we pursue, and the administrating end will complain because work authorized tomorrow was not done yesterday, and we'll be back at the old problem of trying to determine the proper time for a renewal with at least two variables given, the investment needed and the expense of maintaining the old.

It will all transpire in so ordinary a manner and at such a uniform rate that before we are aware of it the miracle will have happened.

What Attitude Should the Street Railway Engineer Take?

It's simply out of the question to be indifferent, but why let our troubles worry us to the point of lessening our efficiency. The old pendulum must come back, and while it's playing around the end of its swing let's look around for something to do. We can't afford to lose our "pep." If we do the time is not far off when some fellow fed up on trouble will take our place. Let's change our attitude toward our troubles and call them problems. Then let's take our coats off and solve them. Let's include industrial difficulties among our engineering research work and systematically clean them up.

What do I suggest? Bless you, it's not subject to mathematical formulæ. Newton's law of action and reaction applies, but even this varies with the locality and size of company. I am later on going to cover a few suggestions, but here all I am attempting is to show the utter foolishness of a negative attitude, because such only aggravates the sore. Reach out and shake hands with what's before you and advise ways and means to make it serve a useful purpose.

We might view this situation from a self-preservation standpoint. The street railway can't be put out of business overnight, either through the process of deterioration or competition by some other method of transportation. It is here for some considerable time to come, it will have to be maintained, considerably reconstructed and renewed before it finally sees its Nemesis. This means much work ahead for the engineer. Work that will tax his capacity as much as original construction. With the foregoing in mind we are involved in this matter through strictly selfish motives and we must not let anything psychological jar our perspective.

This matter of self-interest can be spread. We can show how adequate street car transportation means business for local manufacturers, the butcher, baker and candlestick maker. We can appeal to all those with whom we come in business contact, requesting their support, not from altruistic reasons or as charity, but from the standpoint of benefit to themselves.

I find that few insurance men know that their companies hold street car securities of great magnitude, and when this fact is explained to them it becomes a matter of extreme self-interest. Of course many people not acquainted with national conditions believe the street railway trouble purely local. This class is greatly surprised when told differently, their viewpoint becomes broader and their attitude more tolerant, if not friendly.

Real estate men as a rule fight an increase in fares. Self-interest can be aroused if the menace of inadequate service is brought home to them.

I mention these matters not from an engineering standpoint, but as contact points wherein we can all aid in molding public opinion along right lines. Propaganda work falls in the province of the publicity agent. It's hard to hammer the self-interest nail into place through publicity. Our work brings us into daily contact with manufacturers, agents, contractors, real estate people, and we can talk cold facts in an unofficial way and leave impressions that will arouse self-interest.

Primarily our own individual success depends upon the success of the industry; this fact is paramount. We must strive for improved conditions generally and work industriously on the specific problems coming before us.

"Under New Management"

We have often seen this sign over the entrance of a restaurant that had once upon a time been popular but had for some reason or other lost favor with the eating public. In other words, it had got into a rut and new management was considered necessary to restore its lost prestige.

Let us put ourselves under new management. Somebody once said, "Do something different every day." When you go down to the office tomorrow morning look it over carefully, move the desk around, change the position of your chair; in other words, get a new slant on the old institution. If you can't do anything else, kick over the wastepaper basket, only do something that differentiates today from yesterday. Look over your own past. What was it that made for your advancement? It certainly was not letting a few obstacles bury you deep in a rut.

A short space back I mentioned the fact that there were certain specific problems confronting the street railway engineer which he could well be working on at this time. Before I list these I want you to ask yourselves whether you have experienced situations somewhat as follows:

A great mass of work is thrown on your shoulders suddenly and you have to devise ways and means to clear it up. An organization has to be recruited without having time carefully to select its members. Plans are approved for work that we have a sneaking feeling have not been given as much thought as needed and we wish we had time to study in detail. We know down deep if we had the time we could make changes that would result in better efficiency and greater economy. When such a rush period comes we always bemoan the fact that we are unable to give these matters the study we would like to.

With this example in mind, herewith are a few suggestions. If you run down the list some, hardly all, of the items will recall to your mind papers lying in the deep drawer of your desk waiting for the time when you would have an opportunity to put some thought on them.

1. Increasing the labor-hour output without increasing the payroll.
2. Bettering existing methods of estimating.
3. Improving design of tools and construction equipment.
4. Increasing foremanizing efficiency.
5. Enlarging the field of autogenous welding.
6. Salvaging recoverable scrap.
7. Working up with the auditor improved cost accounting methods.
8. Revising depreciation and renewal tables.
9. Working up valuation schedules and eliminating inherent defects in present valuation methods.
10. Revise drafting room standards.
11. Work up a maintenance program, taking into consideration the relative importance of the jobs to be done, and carefully detailing the methods to be followed in each case.
12. Study the other fellow's methods, with the idea of remedying certain defects in existing methods.

Each Suggestion Is Analyzed

1. *Increasing the labor-hour output without increasing the payroll.*—Science in management has much to offer in the way of scheduling and planning work. Insurance against idle labor can be had through a properly organized stores system. We have long waited the time when we could make a study of the supplies carried with the idea of reducing them to a minimum, taking into consideration the delivery situation. Such a study has paid for itself many times over through increased production and reduction in interest on the stock values. The manufacture of urban and interurban transportation is not much different than any manufacturing business if looked at in the right light. Certain shop efficiency methods can be applied to any industry.

2. *Better existing methods of estimating.*—Proper estimating is a gift that is fundamentally part of an engineer's mental equipment, and yet shunned by many. If we are agreed that before any job should be started somebody, at some time, must state what is to be used, where it is to be used, how it is to be used and when, we immediately appreciate the benefits that will be derived through a proper inclusion in every estimate of all detail possible. A consideration of these matters before a job is started, in conjunction with the engineering design, cannot help but make the work run smoother and relieve the engineer of considerable detail during the job's progress. It is impossible to make an estimate 100 per cent correct, but if we can increase the correctness of our present estimating 10, 15 or 20 per cent we will have put just that much grief behind us. It is a matter worth study and development. Anything gained therewith will increase the engineer's capacity.

3. *Improved Tools and Construction Equipment.*—Most construction equipment will stand a careful study. Do you remember the last job on which certain equipment was used, as you watched it working, you resolved that when the opportunity presented itself you were going to make changes that would reduce the labor required to operate it? You also planned on equipment improvements which would necessitate a certain rearrangement of work schedules, all to the end of reducing the amount of labor required. Is this not the time to study these things and get them finally behind us?

4. *Increasing Foremanizing Efficiency.*—We have all lost good foreman material the last few years and we sometimes feel that if it were not for a few old standbys we would be strictly up against it. There is good foreman material in your present working forces. A study of the personnel at this time and the introduction of schooling methods will dispense with much confusion and misunderstanding when your work program is in full swing. Now is the time to work up qualification

standards and standing orders covering the duties, responsibilities and order of work for foremen.

5. *Enlarging the Field of Autogenous Welding.*—We know that most of us have only hit the high spots in our welding practice. Every once in a while something happens that stirs up an idea wherein the welding field could be amplified and time and money savings result. On one property two men, with a Ford truck and a combined gas and electric welding outfit, are enabled to make a great variety of satisfactory repairs rapidly, economically and permanently. These men are experienced welders and receive a rate commensurate with that paid the most skilled mechanics. They are detailed to repair jobs on track, buildings or the power house. The need of a saw for cutting metals and a drill for boring has almost been eliminated. Welding men have become so expert in cutting metal that a saw is almost unnecessary, and the amount, kind and character of work that can be done is startling.

6. *Salvaging Recoverable Scrap.*—Materials are so costly today and deliveries so uncertain that we are forced to use material which a few years ago we discarded as scrap. How far we should go in the matter of recovering scrap must be left to the judgment of the individual concerned, yet it is remarkable how much old material can be reclaimed by welding. Worn-out assembled equipment and materials that are difficult to get from the manufacturer may be unscrambled and reassembled as good as new. Some companies have established, in conjunction with the stores department, a division that rejuvenates worn-out materials, turning these back to stores. The savings that can be made through reclaiming the waste products of the field and shop are worth looking into.

7. *Working Up with the Auditor Improved Cost Accounting Methods.*—The philosophy of costs has been hammered into us for many years, still there seems to be a great lack of uniformity and understanding among engineers and accountants concerning methods best suited to the conditions encountered in the various phases of our engineering activities. On some properties the engineering department handles all costs by its own organization. In others this function is carried out by the auditing department. It is often found that where conditions as cited above prevail there occurs a considerable amount of controversy and misunderstanding between auditor and the engineer. The best system of cost keeping is one where the cost records are part and parcel of the general books of the company, but detailed, arranged and kept so available that they serve all the purposes of the engineer. Mr. Engineer, take Mr. Auditor out to lunch some day and cultivate his acquaintance; tell him what you want; he has a lot of good ideas and 10 to 1 he will offer to help. We may consider him a lower form of animal life when it comes to engineering costs than ourselves, but if we can show him that bookkeeping and cost keeping are separate and distinct he is certainly in a better position than we are to maintain adequate, complete and comprehensive cost records. In passing, you are cautioned to be patient with the auditor. He is human, even though at first blush appearances do not bear this out. He can't fulfill your every wish in a day or a week; it will take months before the cost records as kept by him begin to suit you. They will come in time and you will have made a friend. Some engineers are prone to consider costs out of their bailiwick and pass the buck to the auditor or accountant, then raise h—— when cost reports don't tell the story. To such men the advice is given, go fifty-fifty on responsibility for costs, the results will tell their own story.

8. *Revising Depreciation and Renewal Tables.*—There are as many different ideas regarding depreciation rates as there are items to be depreciated. If we show depreciation on our books for renewal purposes, then who is better qualified to tabulate depreciation allowances than the engineer? Who knows better the lives of equipment and materials? We have all considered this matter and hoped for a time when we could sit down and give it some real thought. Let's try to work it out now.

9. *Working Up Valuation Schedules and Eliminating Inherent Defects in Present Valuation Methods.*—A great many properties today are being appraised. Some have engaged the services of outside engineers and others are doing the work with their own organization. Many companies intend to substitute "valuation records" for their present "property accounts." This means that valuation records will have to be perpetuated. There is a great deal to do in working up arrangements to cover the retirement and abandonment of property in order that the valuation records may at all times be correct. Several of the larger properties have gone into this matter with a great deal of pains and carefully removed from the property records each item retired. This matter is not strictly a dollars and cents proposition, but involves a complete descriptive record of the property retired in order that the inventory records will always be up to date and subject to the inspection of any rate-regulating authority. These records are of great value to an engineer, inasmuch as they will give him the life of any piece of property and he can therefore determine its economic value.

10. *Revise Drafting Room Standards.*—Drafting room standards can be revised and probably greatly reduced in number. The head draftsman has a number of ideas up his sleeve which he has been waiting for a long time to talk over with the chief. Call him into the office. The results of such a conference will be of great value for the future.

11. *Work Up a Maintenance Program, Taking Into Consideration the Relative Importance of the Jobs to Be Done and Carefully Detailing the Methods to Be Followed in Each Case.*—We all have lists of work necessary, but have we given these lists a careful consideration from the standpoint of the relative importance of the work and the kind of a job necessary? It goes without saying that a line with earnings of $6 per car-hour as compared with a line with car-hour earnings of only $2 should have first consideration on maintenance jobs, all things being equal. Have we placed a time limit on each job beyond which it will be unsafe to operate, and then taking into consideration all the jobs to be done, do we know how large a force we will have to have to complete them within the time limit set? Now is the time that we should be looking to the future and a review of each job scheduled will probably disclose good reasons for changes which will result in economy through a better assignment of foremen and gangs.

12. *Study the Other Fellow's Methods, with the Idea of Remedying Certain Defects in Existing Methods.*—In general we know that certain of our long-cherished methods could be revised in certain respects. The details of the revisions have been jotted down in our notebooks as a result of visits we made to the other fellow's property. We know of places where some of the

other fellow's ideas can be used and we have long waited for an opportunity to put some of them into effect. While things are returning to normal a golden opportunity to institute these changes presents itself.

CONCLUSION

"It is much easier to find fault and grumble than it is to do constructive work or help the other fellow who is trying with all the power within him to do such work." I don't know who wrote this, but it's worth framing.

Let's keep to fundamentals and not confuse them with unusual happenings of the long ago. Just as sure as tomorrow, will come a return to normal. In the meantime let's co-operate with the management and operating officials for an understanding that will make our work better and the outlook pleasanter. Let's co-operate with each other so that our working and playing time will be happier and filled with confidence. Criticise only when both sides of a question are thoroughly understood and we have made deductions therefrom which can be molded into constructive shape and disseminated.

Above all, let's stop waiting for a miracle to change today back to yesterday.

Get the Power Plant Into Line

A Specific Example Shows One Instance of Useful Engineering Activity

By E. H. SCOFIELD

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WITH the demand for increased economy in the electric railway industry it is well for the one responsible for the operation of the power equipment to look to this job and to see that it can stand on its merits.

There is not a steam power plant in operation where practicable improvements in equipment and performance could not be introduced. One of the most vital features in such a plant, and the one most generally considered not easily improved because of limitations imposed by the original installation, is the boiler and furnace equipment.

As illustrating what may be done to overcome such limitations, the experience of a certain plant will be of interest.

A plant of twenty-four boilers, Babcock and Wilcox 556 hp. parallel drum, incline header, thirteen tube high, 540 sq.ft. of superheater was installed with header eight feet above floor line; a 14-ft. basement; two masonry stacks, 16-ft. x 225-ft. and to be served by an old type of underfeed stoker designed to operate the boiler, under test conditions with good fuel, at a maximum of 150 per cent of rating.

It was found necessary, however, to provide for burning any low-grade coal and inclined rocking grates were substituted. These proved inadequate for capacity and efficiency and objectionable on account of excessive smoke.

Chain grates were then installed, masonry stacks replaced by four steel stacks, 14 ft. x 265 ft., special provision made for supplying air to the furnace, four boilers added in the space formerly occupied by stack foundations; resulting in marked improvement. Various improvements were introduced, in arch construction, suspended arches, inclined arches, inclined grate with rear end dropped below floor line, receding bridge wall for increasing combustion chamber and increasing exposed tube surface, boiler raised 2 ft. in its setting, air jets and steam jets introduced to improve mixture of gases and complete combustion before entering tubes.

All these changes in turn resulted in improvement. However, with increased demand for steaming capacity it was found that the limits in capacity and efficiency were reached in this equipment at about 200 per cent rating.

Attention was then directed to the modern underfeed stoker and an equipment installed. The stoker floor line was lowered 2 ft. below the boiler room floor, the face of the stoker projected 4 ft. in front of the boiler face, a 4 ft. low arch filled this space, a vertical bridge wall in combination with the above left a comparatively small combustion chamber and a short exposure of tubes. The ashpit capacity was greatly reduced by the low stoker setting. It was found that this equipment when supplied with high grade, low ash coal would develop 300 per cent rating of the boiler, but the efficiency was low. However, when trying to burn coal with high ash and sulphur it was found impossible. Clinkers formed over the fire surface, anchoring to front, side and bridge walls and to the tuyeres and dump grates.

BURNING LOW-GRADE FUEL

To overcome these difficulties radical changes were required. The stoker mechanism was modified to provide distribution of fuel in a bed of uniform thickness. Tuyeres and air control were changed to give more uniform air distribution, boiler was raised 2 ft. in its setting and the overhanging arch eliminated, water boxes installed, lining all sides of the furnace at fuel bed line. These afterward were replaced by inclined tuyere air boxes at side walls and at front wall displaced by the use of steam jets, installed for the purpose of mixing the gases. The bridge wall was moved 7 ft. back from the dump grate, eliminating the necessity for a water box and allowing a baffle plan which exposed the lower boiler tubes to the furnace heat for 85 per cent of their length. These changes eliminated as far as possible direct reflection of heat on the fuel bed and gave a combustion chamber of 1,400 cu.ft. for 110 sq.ft. of grate surface. Power operating mechanism for dump grates made possible frequent dumping.

Following these improvements it was found possible to operate successfully on any grade of fuel, including damaged coal heated in storage of less than 9,000 B.t.u. heat value, at 300 per cent boiler rating for hours. It was possible to bring the boilers from banked fires to this capacity inside of thirty minutes and to obtain high efficiency throughout a wide range of load with carbon losses under 12 per cent and CO_2 14 per cent to 15 per cent, complete combustion of gases before entering tubes, normal stack temperatures, comparatively low temperatures at surface of fuel bed with slight forming of clinkers and no trouble from clinkers anchoring to furnace walls or stoker or in dumping to ashpit.

As a result of the experience gained with this installation a complete new plan was developed, including a redesign of the mechanical features of the stoker. In this plan the stoker floor line is lowered 3 ft. below the boiler room floor, giving the effect of an 11 ft. setting without raising the boilers, the stoker face set flush with the boiler face, a combustion chamber of

1,300 cu.ft. obtained and a tube exposure of 85 per cent. New ashpits have a capacity of 600 cu.ft. each, without requiring change in the ash conveyor. Superheater surface is increased 50 per cent by replacing with longer tubes in the same headers.

The above is given as an illustration of what may be accomplished along any number of other lines toward making the most of the equipment and conditions prevailing. For example: The difficulty of obtaining skilled operators at reasonable expense for operating may be relieved by so organizing the work that a few skilled operators supervise the work of unskilled helpers. A study of the characteristics of main generating units and their auxiliaries will indicate the loading and choice of service which will result in the greatest economy. A complete and systematic set of records of performance is of the greatest importance in determining in what direction to attempt improvements.

The Corner Has Been Turned

We Are Making Satisfactory Progress, but We Have Still a Long Way to Go Before the Ultimate Goal Is Reached

By W. H. SAWYER
Vice-President E. W. Clark Management Corporation, Columbus, Ohio

THE struggle has been titanic in its immensity and at times the apparent results staring us in the face have closely approached the seriousness of the disaster which befell the good ship *Titanic*. "The corner has been turned," the worst is well behind us.

We have been saying right along that we believed in the good sense of the American people. We did believe in them, although at times our faith was almost shattered. I say "the corner has been turned" because now we are definitely to the point where the American people are saying in a positive voice that they need service, that they must have service. This public still has the natural human desire to want this service at a lower rate than is compatible with good service, but rates today are secondary.

When the public asked to keep confiscatory rates in force it did not appreciate that its unfair attitude meant that later it must pay an even higher price; it did not appreciate how loss of confidence affected cost of money; it did not appreciate that inability on the part of the street railways to borrow money meant higher operating expenses and poorer net results, which the public must ultimately pay for. Street railways today are in no position to borrow money for improvements, and every day they are unable to borrow money to make improvements which will lower operating expenses and increase net income makes the conditions worse and brings the price higher which the public must ultimately pay. We have not as of today the confidence of the investing public, and this means that the riding public must today pay a higher rate of fare than it would have had to pay if we had that confidence. A proper rate of fare for today's condition does not today restore that confidence, but once it is understood that the public really and honestly appreciates that it must have service and is willing to pay for it, even though grudgingly willing, we will have not only "turned the corner" but will be well on the road to a return of confidence. The manufacturers want production; the manufacturers, workmen and the public need transportation so that they may get this production.

"The corner has been turned," as, go where you will today, the predominant note is "we want service." The public may still be selfish, giving voice entirely to its own personal interest, but the question of street railway service is vital if other industries are to continue to function. That part of the public which really analyzes from the public good is not only asking for service but is demanding more service, more efficient service, and it is demanding this because it knows that it is vital to its business.

However, the main issue is still before us, if the public wants the service that it says it does and as I believe it does it must be brought to a full realization that we cannot give that service except as we are given a rate of fare which will enable us to take further steps toward restoring confidence to the investing public. We must compete with other industries for the cost of money to make improvements, to operate more efficiently. Due to the havoc and destruction which has been wrought by the public, it is necessary that it pay a higher rate of fare to enable us to borrow money than would have been true had we been treated fairly during the past.

The public today wants service; electric railway men of this country want to give that service, and the legislature, the public utility commission or the city council which does not appreciate this will take a responsibility of opposing increased rates with very different results than would have been the case two years ago. It was then believed to be politically wise and expedient to neglect the question of service. The "corner has been turned," the public wants service, and the politician who believes otherwise is only fooling himself. To give that service, demands for which are becoming more and more insistent, means today just what it has always meant, just what it would mean in any other business, namely, that we must have a rate of fare which will enable us by our records to restore confidence to the investors.

Co-operation the Keynote of the Future

From our past experience we should now draw conclusions as to what we of the electric railway fraternity should do in the future. My own thought is that we should continue along the same general lines under which we have been working. We must continue to be aggressive and constructive, and must above all things *co-operate*. While one man or one organization may be able to work out the problems of a local situation, the results can certainly be accomplished more efficiently and more satisfactorily by heeding the advice and experience of others. Our detailed problems only are local; the question is a national one, differing in different localities only in local details. We must continue our publicity; we know the facts as no one else does and we must tell the story in plain, truthful language, so that the people will understand that it is their problem fully as much as it is ours, and that our province is to try to work out the mutual problems to their satisfaction.

We must give even better support to the American Electric Railway Association, to our State association and to the ELECTRIC RAILWAY JOURNAL. We must work and give that we may receive. I fear not the ultimate outcome. Electric railways are more than an essential

industry; they are an integral part of our civic communities, and the prosperity of one is absolutely dependent upon the prosperity of the other.

Maintenance and service are today below par because confiscatory rates have kept us from spending money which we could not secure. This condition still exists, but we cannot afford for the public good to be too pessimistic or unfairly pessimistic as to the future. We must tend to improve our maintenance and our service, even if past records do not justify this. In other words, let us go forward in so far as we may on the basis that we know that ultimately street railways are going to give the service required by the public and that the riding public is going to pay a rate of fare which will encourage an investing public to renew its faith in this vital necessity.

I have said in effect that the people, our customers, the public whom we serve, have changed their attitude and are beginning to appreciate the situation. A continuation of constructive, co-operative work on our part must ultimately bring them to a full realization of the mutuality of our interests. Continue as we have been doing, but let us profit by our experience; do not let our shots scatter so widely, and we will achieve success of which we may all be justly proud in that we have been a most important factor in saving from ruination and in restoring to proper functioning that civic necessity—the electric railway.

Sell What the Public Wants

If We Would Be Like Other Business in Theory, Let's Be So in Practice—Know the Public Intimately and on Good Terms—More Important Than Any Economies

By an ENGINEER

YOU have very kindly offered me the opportunity to take part in a symposium on the obligations and responsibilities of the rank and file of the electric railway industry in the present critical times. I appreciate and am grateful to you for the privilege and the compliment, but I feel that I cannot do justice to your plan because, frankly, I do not think it touches the real trouble. There is no question that in many cases practical things may be done to help the individual situation, but when we consider, on the one hand, the extent to which, in the past years, we have reduced the costs of operation—when measured on a common basis—and on the other hand the fact that with very few exceptions our electric railways range in condition from that of barely paying expenses down through varying degrees of financial distress to receiverships, cessation of operation, and in some cases sale as junk, it must be clear that there is something fundamentally wrong.

Certainly it is not because transportation has ceased to be essential, for business without regard to humanity and personal welfare without consideration of industry alike demand more and better carriage of men and materials. Neither is it because the electric railway is an out-of-date instrument, for while the jitney in the summer time may give a more rapid and convenient service, averaged through the year it falls decidedly short of the service of any fair trolley system. Why then does not the public buy the transportation offered by the electric railway to an extent which would at least carry the lines, if not yield a proper return?

It seems to me we must look for light in the lines of industry which have proved profitable. At once you say, "but conditions are different; these industries can adjust their selling prices to the cost of production, while we are tied to a shrinking rather than even a fixed rate." Very true. But the public is not obliged to buy many of these products, yet it pays the price as it is increased, so long as it gets the article it wants. And in those last nine words is the whole story. Just now the public as a whole doesn't want what we are offering them as trolley service, and if we are really honest with ourselves they have at least some reasons for their position. Considered as a whole, our equipment is old and dirty, our roadbed rough as to both line and level, and our schedules fixed by the clock rather than by the convenience of the riders. Again you say, "If we cannot earn enough to make our securities attractive we cannot borrow money, and without money we cannot buy new or repair old equipment, nor can we maintain our tracks." True again. Yet how many great businesses have been built up by men who started with neither capital nor credit, how many of our own lines trace back to nothing but enthusiasm of the starters of the project? What have we done that we cannot today make good in spite of the discouraging conditions facing us? Let us look back for a moment to other industries. Success in an industry depends, outside of indomitable courage and unflagging energy, upon the production at a reasonable cost of an article which the public wants, either through a natural or a created desire, and upon merchandising that article so that it is kept sufficiently attractive to the public to insure that it is demanded in such amounts and ways as make its sale profitable. And, incidentally, the wise merchant brings out the shortcomings of his competitor, not by direct attack, which always breeds a sort of sympathy for the object of that attack, but by setting up the virtues of his product in such a way that the comparison is sure to be made by the desired customer. On the manufacturing side we have done fairly well; there is room for improvement, but we have steadily raised the efficiency of our processes until any really

The engineer who wrote this cryptic practical message is in touch with most of the problems of a large system. He believes his message is more telling if presented anonymously and states that it might be "undiplomatic, to say the least," to announce his identity.—Editors.

great gain can come only through some new development. On the merchandising end, however, we have not so much to our credit. In other lines the alert merchant advertises freely the desirability of his wares, the convenience of his store, the courtesy and attention of his selling force, and is untiring in his efforts to maintain and even exceed his promises; by co-operation with other merchants through national or divisional organizations he endeavors to keep in close touch with the desires of the public and the best general methods of meeting them; through active membership in local boards of trade and business men's associations he gets the "local color," and at the same time identifies himself with his city's affairs and establishes for his business a personal relationship, while by frequent staff meetings with his heads of departments he keeps them and himself in close touch and harmony, while frequent departmental conferences carry the spirit of "the old man" down the line.

Where does the electric railway industry stand on this internal work of merchandising? The American Electric Railway Association contains a very considerable part of the trolley mileage of this country; very valuable papers are presented at its semi-annual meetings, and its committees do splendid work. But how extensively are its recommendations and standards followed? How much of the committee work is availed of by the member companies? Locally how actively is the trolley represented in the Rotary and Kiwanis Clubs, the local Board of Trade, Men's Clubs and the like, not merely as being on the list of members, but as taking a real part in the work? And finally in the family circle, so to say, how closely is the organization kept in touch with the situation? How effectively is the company's loyalty maintained and supported—for loyalty demands a measure of confidence, both as its reward and its guide.

When we measure up the industry as a whole, are we not compelled in all honesty to admit we have at least fallen short of our duty here?

It is in the direct relation with the public, however, that the trolley fails to meet the modern idea of merchandising. In other lines of salesmanship times of stress are times for the most careful attention to quality of product and method of displaying it; advantage is taken of every opportunity to put a possible customer where the real product is shown; the latter is made as attractive as possible, and if there is competition, the weaknesses of the competitor's goods are brought out, not by attack on him, but by exhibiting the contrary in the seller's own stock. Last of all is there threat or sulking.

Yet with the example of years of selling are we not doing exactly that which in other lines of business would be certain suicide? Consider our attitude toward the jitney. Granted that it is an outrageous—indeed a criminal—competition. What do we do? We damn the jitney and demand its immediate suppression, thereby creating a feeling that we are picking on a little fellow, when a plea that it be called upon to share the paving and similar trolley burdens would get at least as much attention and if granted would be just as effective a step as an ordinance to that effect. And when the public does not suppress the "jit," instead of making our service so attractive that we starve the other fellow out, we instead endeavor to bulldoze the public into riding with us by cutting down the service and making it less desirable!

And haven't we paved the way for the jitney competition and the serious losses we suffer through the one-time trolley riders who are now picked up by their auto-owning friends, or who ride in their own autos, by a pretty thorough disregard of their riding habits at a time when we could say "Ride, damn you, or stay at home" and get away with it?

I believe we have got to start fresh, shutting down a very considerable mileage, not with loud words of defiance, but in considerable humility and a frank admission—and one that will stand investigation without blowing up—that we haven't the money with which to run in competition, and that, too, without mud slinging at a competitor which, however much we may damn it, and—on paper—prove its unprofitableness, still remains a mighty unpleasant absorber of revenues we need the worst way.

Moreover, we have got to forget many of the "principles" of operation we have been following; we have got to make schedules to meet the convenience and wishes of the public, and we have got to make our service so attractive that the public will come to us for the same reason it goes to certain of our merchants in preference to others. That our competitors are not playing fair, that the public is not playing fair, is all beside the question. These are actual conditions we are up against. We must meet them and overcome them, or bust.

And because I sincerely believe this I do not feel justified in urging the men in my field of the industry to get busier in economies until these more fundamental matters, as I conceive them, receive their share of attention.

Coal Production Decreasing

THE weekly report on bituminous coal compiled by the Geological Survey shows a 3 per cent decrease in the coal production for the week ended June 19 as compared with the previous week. The total production for the year to that date was 201,170,000 net tons, an increase of 40,100,000 tons over the production of 1919, but a decrease of 24,250,000 tons as compared with the production in 1918.

The production up to March of this year almost equaled that of 1918, but the railroad and mine strikes during March and April lowered production to below normal.

The production of coal has been increasing very rapidly during May and June, but the recent walkout of switchmen is again causing a car shortage at the mines.

Optimistic reports are given out by the railroad executives as regards car shortages. They state that grain cars are now in the harvest district and coal cars in the mining district and the result should be a marked improvement in transportation conditions, providing no strike occurs to prevent car movement.

The Geological Survey report shows that the electric utilities in New England have more than five weeks' supply of coal on hand and the coal gas plants more than four weeks' supply, but that the total tonnage of bituminous coal has decreased from 567,831 on February 29 to 481,652 on May 31, or about 86,000 tons decrease for the month. This does not indicate an encouraging fuel situation in that stocks should be increasing.

Protection Against Shock in Indoor Substations*

Some Simple Principles and Precautions for the Mitigation of Accident Hazard on High-Tension and Low-Tension Circuits

By E. F. BRACKEN
General Inspector of Substations Commonwealth Edison Company, Chicago, Ill.

IN ALL substations the presence of electrical energy at high voltage introduces physical injury hazards, which must be reduced to a minimum by the use of suitable apparatus and safety devices and by the application of proper rules governing procedure in its operation and control. In the case of rotary converter and motor-generator units and other machinery having moving parts there are hazards which must be guarded against by means of suitable shields and rules of procedure.

Electrical energy is generally delivered to substations at from 4,500 up to 110,000 volts. High-voltage circuits in buildings should be so placed as to render physical contact with them difficult and to reduce the possibility of accidental contact with them practically to zero. This may be done by placing open and uncovered conductors up out of ordinary reach of substation attendants and workmen, or, if they must be placed at lower levels, by completely inclosing them in suitable structures.

High-tension manually operated air-break switches intended for opening circuits under load should be situated several feet higher than a man's head, remote from grounded iron work, and should always be operated by means of a long wooden pole. The pole should not be allowed to accumulate moisture, dirt or acid and, therefore, should never be put or kept near an open window or in a storage battery room or other place where it may be touched by acid vapors. As a further precaution, the operator of such switches should, while operating them, stand on an insulated stool and wear rubber or dry leather gloves.

Air-break disconnects in series with oil switches are not generally suitable for opening a circuit load, and any attempt to use them for this purpose is likely to produce a heavy arc sufficient to burn the operator. Such disconnectives should never be removed unless the oil switch in series with them is open. If the switch in series is open the removal of such disconnects while they are alive is not especially dangerous, provided proper precautions are taken to insulate the operator from earth. The operator should be thoroughly insulated from ground by an insulated platform or rubber mat and from the disconnectives themselves by means of a wooden stick or high-resistance device by which he manipulates the disconnectives.

In general no one should be allowed to attempt to work upon or in close proximity to live high-tension conductors or conductors which may become alive during the continuance of the work. For this reason all such conductors should be disconnected from all sources of high potential and measures should be taken to see that no person can restore any of the connections until the work is completed. The nature of the precaution against making conductors alive during the progress of the work will depend largely upon the number of persons who might be in a position to perform such an act. If no one but the workman himself could make them alive the precautions may be very simple. If several persons are in position to do so, it is desirable to use signs, warning signals or even locks to prevent such an act.

All structures which might be made alive as a result of a breakdown of the insulation of high-tension conductors should be carefully grounded. This applies to cores and cases of transformers, frames of high-tension generators and motors, starting compensators and frames of switchboards carrying high-tension conductors. The substation attendant must carefully bear in mind that high-tension current may cause injury both by burn and by shock. In general a person is not subject to electric shock unless some part of his body becomes a part of an electric circuit, and the danger of becoming a part of a possible circuit always must be considered and guarded against.

It is for this reason that rubber gloves, insulating stools, insulated sticks, wooden handles, insulated pliers, insulated screw drivers, wrenches, etc., are used in work on or near live conductors. Electric shock by high-tension current through a vital part of the body is liable to produce severe physical injury or even death. A nearby electric arc may burn the flesh even if an individual is so carefully insulated that he cannot become a part of an electric circuit. Therefore it is not sufficient merely to guard against becoming a part of an electric circuit, but no act should be performed which can possibly cause a heavy arc in close proximity to the body.

Moving machinery offers a type of physical injury hazard which is already quite well recognized. The precautions, safeguards and procedure are in general similar to those pertaining to other rotating machinery, such as is found in machine shops, factories, etc. Guards are used to prevent accidental contact with rotating parts and suitable rules of procedure are designed to prevent undue exposure where guards are impracticable.

Some types of rotary converters in railway work are subject to flashovers under conditions of severe short circuit. Such flashovers are liable to throw an arc quite a distance from the end of the machine, and to throw particles of burning metal still further. Fortunately such flashovers are rare, but they indicate that one end of a 600-volt railway rotary converter is not a good neighborhood for the operating attendant's desk or resting place. Proper installations and protective devices will do much to reduce the severity of such disturbances, but they have not yet made the zone at the commutator end of a railway rotary converter thoroughly desirable as a place in which to spend one's spare time. An operator should never undertake to make adjustments or even close inspections of direct-current brushes of railway rotary converters which have a tendency to flash over except when the unit is entirely disconnected from all sources of possible load.

"Low tension" is a term which has been very exactly

*This article is adapted from a longer one appearing originally in the "Safety Bulletin" of the Commonwealth Edison Company.

defined, but in this discussion will be used to refer to electric pressures below 750 volts. Too many men have a feeling of immunity against injury by shock from circuits with potentials of 110 to 250 volts, and some have far too little respect for railway current at 600 volts. It should be remembered that while 110 volts will not ordinarily produce an unpleasant sensation of shock and to some persons 250 volts is only mildly unpleasant, yet it is a matter of record that men have been killed by 110 volts alternating current and others by 250 volts direct current. If men can be killed on 250 volts direct current substation attendants in railway substations should remember that the output is decidedly dangerous and is capable under some conditions of producing death by shock.

Injury by burn as a result of an arc is to be guarded against and it is to be remembered that while a low-tension arc will not hold through such large distances as a high-tension arc, yet on account of the larger currents they are as a rule heavier and more destructive.

Inasmuch as practically all electric circuits show a potential difference between at least one conductor and ground and some between all conductors and ground, it is apparent that any one touching such a conductor will become a part of the electric circuit to ground if he is not properly insulated from the earth. Proper insulation varies with the voltage of the circuit. For 250-volt light and power and 600-volt railway work dry wooden platforms, wooden mats, rubber mats and dry battleship linoleum are satisfactory. If wood or linoleum is subjected to the ordinary floor scrubbing operations the use of strongly alkaline soaps is likely to reduce its insulating properties to some extent, especially while it is wet. It is possible also to use a commercial insulating compound which can be applied to a floor by means of a trowel, becomes hard in a few hours and which is not affected by moisture.

For high potential it is necessary to use much better insulation. The most common device is a dry wooden platform, either portable or stationary, mounted on high-tension insulators of a grade considerably better than is used for line work on the same voltage. In the use of such a platform there is practically no danger that the operator may become a part of a circuit to earth through the platform itself, but it may give him a false sense of security, especially in congested places, where high-tension, bus-carrying structures are placed close together.

Group Insurance for Employees

THE Lackawanna & Wyoming Valley Railroad (Laurel line), Scranton, Pa., has taken out accident liability group insurance for all of its employees. Each policy provides that in case of sickness or of accident incurred other than due to company work the employee shall receive weekly 50 per cent of his or her wages for a maximum of twenty-six weeks and effective after the first week. The company had already provided group life insurance for its employees, a policy in the amount of $500 being presented to each employee after six months of service. This is increased annually to a maximum of $1,000 at the end of five years of service.

Plans for a local council of the National Safety Council for Chicago have been approved by the Association of Commerce and the heads of forty industries. Samuel Insull is one of the leading spirits of this movement.

Shanghai Tramways Are Prosperous

Short Trackless Trolley Line in Successful Use—Tramways Are Supported Largely by Chinese of Modest Means

THE recent visit to this country of David McColl, general manager of the Shanghai Electric Construction Company, Ltd., which operates the tramways in the International Settlement in Shanghai, China, renders timely a brief summary of the present status of rail transportation in that city. A man of extensive tramway experience in England, Mr. McColl took up the development of this property some ten years ago. It is today one of the more progressive companies of China, as is shown in the development of its shop and roadway equipment, track construction and car equipment, organization and system of "inspectors" designed to meet the peculiar local conditions in Shanghai. Mr. McColl is enthusiastic with respect to the property and is trying out a number of plans for extending its usefulness, including the use of rail-less trolley vehicles.

The rail-less trolley buses are of particular interest, with their special form of drive (a motor driving, through a worm and wheel with 7.25 to 1 reduction, a shaft, which in turn is connected through the differential to the rear wheels, as in standard automobile construction). The bodies, built in Shanghai, are special, with side entrances in order to provide for first and third class compartments. A special trolley pole, with two wheels making contact with the two overhead trolley wires, has been designed and made up by the tramway company and a special shoe, which is lowered and drags on the street rails to complete the electric circuit



RAIL-LESS TROLLEY BUS IN SHANGHAI

when the bus passes over the rail tramway (equipped with single trolley) from the carhouse to the trackless zone.

A novel method has been used for saving power on this system. On the front end of each car is a small semaphore interlocked with the controller handle, so that the inspectors on the streets or in the shop windows can tell at any time by the position of the semaphore the position of the controller and whether the motorman has his controller in the proper position.

A great deal of attention is paid to personnel on the Shanghai property. The superintendents and inspectors are foreigners generally, the car crews are Chinese, the

conductors having to speak English as well as Chinese. The men are treated well and are remarkably loyal to the company.

The situation in Shanghai was covered briefly in the recent report made by Frank Rhea, trade commissioner, to the Bureau of Foreign and Domestic Commerce of the Department of Commerce of the United States.*

Mr. Rhea points out that Shanghai contains three of the eight tramway lines in China (including two in Manchuria). These three tramways are, respectively, in the International Settlement of Shanghai, the French



ONLY ONE TROLLEY POLE USED ON SHANGHAI RAIL-LESS BUS

Concession of Shanghai and the native city of Shanghai. The lines of the Shanghai Electric Construction Company are located in the foreign settlement (except the French), or in what is otherwise known as the International Settlement of Shanghai. The total length of route is about 16.25 miles of rail line and one mile of rail-less trolley.

The riding on tramways in the city is largely confined to the ordinary class of Chinese, as wealthy Chinese and foreigners as a rule travel in jinrikishas or other conveyances. There seems to be a growing tendency on the part of the less well-to-do class of foreigners to ride on the cars, but the proportion of foreign passengers on all lines is very small. Mr. Rhea states that the company's tracks are well constructed and maintained and that the rolling stock comprises ninety motor trolley cars, seventy trailers and seven rail-less trolley cars. Part of the power is generated in the company's own power house and part is purchased from outside.

First and third class fares are charged, but Chinese women ride first class on payment of third class fares. Practically all foreigners ride first class. The zone system of fare collection is used, the first class fare for each zone being three copper cents and the third class fare one-half of this. On payment of fare passengers are given numbered and colored identification slips, and "surprise" checkings by special inspectors are conducted at frequent intervals.

Practically all fares are collected in the form of Chinese copper cents or "small silver money" (both of which are at a substantial discount) and converted into Mexican dollars, at an average of about 125 copper cents to the dollar.

*Special Agent Series No. 180, entitled "Far Eastern Market for Railway Material, Equipment and Supplies."

The rail-less trolley runs through a very congested district of the city. Service was first established in 1915 over a 0.7-mile route, and this was extended in 1916 to the present length of one mile. The Municipal Council has been considering a proposal for a 9-mile extension of this service. In a statement presented to the Council the claim was made that these cars occupy an area of 158 sq.ft., while twenty-eight jinrikishas carrying the same number of passengers would occupy 2,500 sq.ft. to permit of proper movement.

The average cost of the seven rail-less cars now in service was $12,850 Mexican for each complete equipment, and the actual cost of the present installation, including the double trolley, was $137,575 Mexican, including a contribution of $26,022 Mexican for street paving. Results for the latter half of 1916 showed a profit of about 15 per cent on the investment.

The head office of the Shanghai Electric Construction Company is located at 2 North Soochow Road. The following are the officers located in Shanghai: General manager, David McColl; deputy manager, J. G. Smeaton; traffic manager, E. Carroll; rolling-stock superintendent, J. L. Gordon; assistant rolling-stock superintendent, H. G. Sadler; line engineer, H. J. Blatchford; assistant line engineer, T. H. Brownlie; storekeeper, J. L. Stuart. The secretary of the company, L. W. Hawkins, is located in London.

Accident Situation Improves

ACCORDING to the 1917 census figures, relative to the number of accidents in the electric railway industry, which were recently issued, there is disclosed a decided improvement in the trend of the accident account. In 1902 1,218 persons were killed and 47,429 were injured in electric railway accidents. In 1907 2,411 persons were killed and 118,269 injured. In 1917 the number killed was 2,517 and those injured 141,854. In other words, while street car fatalities increased 100 per cent during the five years between 1902 and 1907, the increase during the ten years between 1907 and 1917 was only 8 per cent. Likewise, the non-fatal injuries increased approximately 150 per cent during the five-year period between 1902 and 1907, while the increase during the next ten years was 20 per cent.

The trend of accidents is perhaps shown in better light by noting that during 1919 3,086,319 passengers were carried on street cars per one person killed, while during 1917 the number of passengers carried per person killed was 4,393,572. Expressed in percentage, the electric railway accident hazard decreased approximately 33 per cent during 1917 as compared to 1907.

The good showing which appears to have been made in the accident account is largely attributable, no doubt, to the perfection and more extensive use of mechanical safety devices, to improved methods of operation, and to the safety-first work that has been done to train both employees and the general public in the exercise of precaution. If figures were available up to date, there is some misgiving on the part of men closely associated with the claims departments of street railways companies that they might show an increasing trend, owing to the enormous increase in the number of automobiles in use. This is now the principal source of accident in the electric railway field, as it is also in other activities.

Lehigh Valley's No-Accident Week

District in Pennsylvania Sets New Standard in Safety Drives and Reduces Accidents 90 per Cent

BY LOUIS RESNICK
Editor *National Safety News*

AT 1 O'CLOCK Monday afternoon, May 10, a shrill siren blast resounded throughout the Lehigh Valley of Pennsylvania and at that moment there was started the most comprehensive and most successful No-Accident Week thus far conducted by any community in America.

More than half a million people in twenty cities and towns answered the call of that siren. During the next seven days 170 safety talks were made, more than a million pieces of safety literature were distributed, thousands of safety essays, slogans and posters were prepared by the school children of those twenty cities, hundreds of plant safety meetings were held, safety sermons were preached in the churches, 100,000 letters on safety were written by the children of the district and as many safety pledges were signed by their parents, resuscitation demonstrations, fire drills and other first-aid contests were carried on in practically every community in the district, and at every turn throughout the week the half million people were confronted with safety signs, safety exhibits, safety movies, safety parades.

What were the results? Here are a few:

A reduction of 92 per cent in mining accidents.

A reduction of 80 per cent in electric railway accidents.

A reduction of 36 per cent in all public accidents.

A reduction of more than 90 per cent in accidents at the largest industrial plants in the district.

The Lehigh Valley produces 90 per cent of the world's output of slate and 60 per cent of the world's output of cement. In addition to its quota of these products, the district during the week of the drive produced thousands upon thousands of tons of steel, tens of thousands of tons of coal, thousands of tons of zinc and great quantities of silks and other products. And not a single fatality due to an industrial accident was recorded within that week.

Of far greater importance than the actual reduction of accidents during this particular week was the influence of the drive on the conglomerate population of the Lehigh Valley. This district employs as heterogeneous a lot of workmen as can be found anywhere in the world. Slavs, Hungarians, Poles, Italians, Spaniards, English, Scotch, Welsh and the rather famous native "Pennsylvania Dutch" predominate, but forty-nine other nationalities are well represented in the Lehigh Valley.

Think of 125,000 immigrants working in the steel mills, coal mines, slate quarries, cement, zinc and chemical plants of America an entire week without a single fatal accident. Better still, think of an eighth of a million men of this type working hand in hand with their employers, with the city, state and county authorities in a great community betterment movement. Practical Americanization, improved industrial relations and accident prevention, all in one.

Of greater importance than the saving of lives, limbs and dollars through the reduction of accidents during the week of the drive were:

First, the creation of a public sentiment among both the big business men and the workers for a permanent safety campaign; this will be carried on through the co-operation of the Lehigh Valley Division of the National Safety Council and the various chambers of commerce of the valley.

Second, the establishment of safety education as part of the curriculum of every public school in the district; pledges to this effect were given by school superintendents throughout the district even before the close of No-Accident Week.

Third, the real conversion to safety of many men, both plant managers and workmen, who before had looked upon it merely as a fad.

How the Drive Was Conducted

Approximately a million pieces of safety literature were distributed during the drive. Through the school children 75,000 window cards reading "We have signed the safety pledge—be a booster" were placed in the homes. On the reverse side of each card facing the interior of the home was this message: "Is your home safe? Fathers and mothers are morally obligated to make their homes safe and to teach their children safety."

Then followed eight rules to make the home safe, covering such hazards as scalding, matches, nails, poisons, gasoline fume explosions, falls, dangerous stairways and a suggestion for the use of iodine to prevent infection.

On Monday, the week of the drive, the teacher in every schoolroom in the valley wrote a form safety letter on the blackboard and every child was instructed to make a copy of this letter in his or her own handwriting, addressed to the parents. These letters, together with pledge cards, were taken home by the children to be signed by the father, the mother and the pupil. Upon the return of the signed pledge a window card was given the child. Possibly the best indication of the seriousness with which the entire drive was taken is had in the fact that in every school more than 90 per cent of the pledge cards issued were returned signed, and in many of the schools the returns were 100 per cent.

Attached to the pledge card was a leaflet, to be detached by the parent after signing the pledge, containing on one side seventeen "fire don'ts" and on the reverse "safety don'ts" for the home and the street. An expert acrobat was hired to illustrate by hairbreadth escapes traffic hazards.

The Boy Scouts and the Campfire Girls of every city in the valley were enlisted in the drive, with very gratifying results. Through the co-operation of the Boy Scouts 10,000 windshield stickers, carrying on one side a safety message that could be read by the pedestrian and on the reverse side precautions for the driver of the automobile, were posted on the windshield of practically every automobile in the district. Ten thousand additional safety cards were hung on the radiators of automobiles and motor trucks.

Through the department stores, wholesale houses, public utilities and other places of business 150,000 safety circulars carrying nine specific messages on street and home safety were distributed.

Fifty thousand bulletins reading "We are helping to make this community safe" were posted, in addition to thousands of National Safety Council bulletins which were placed at strategic points in and about every industrial plant in the valley.

Street banners were supplied to every city and town

and every available billboard and fence was decorated with a safety message during the week.

The business interests of the valley came into the drive with all the facilities at their disposal. Every letter that was mailed and every package that was delivered from a mercantile establishment in the Lehigh Valley during this week carried with it a message on safety. Community safety posters were displayed in the windows of every business house and many of the department stores set aside their best show windows for safety displays. To bring the people from the rural districts into the cities, where they could observe the drive in all its intensity, department stores throughout the valley put on special No-Accident sales and made genuine price reductions.

Mass meetings of school children were held in every city every day of the drive and each meeting was preceded by a parade of the children from the school to the Auditorium, where motion pictures were shown and short safety talks were made.

Garages and gasoline stations posted public safety bulletins throughout the week so that every time a motorist stopped for gas or grease he was reminded of the hazards involved in driving an automobile. The first day of the week of the drive was designated as "Safety Sunday" and from the pulpit of every church in the valley a safety sermon was delivered.

In the larger cities the pedestrian was literally confronted with safety slogans at every step, for on block after block of city pavement the Boy Scouts had stenciled on the walks outlines of the human foot in which were painted such messages as "Watch your step" and "Safety first."

Advertising Changes in Routing

How the Los Angeles Railway Placed the Facts in a Commission Report Before the Public

By J. G. Jeffery
Director of Public Relations Los Angeles Railway

A SAVING of 4,000,000 car-miles per year, reduction of power consumption by 13 per cent, with a general speeding up of all lines through an extensive rearrangement of traffic, is the program established by the Los Angeles Railway on May 9. The plan was developed with the basic idea of retaining the 5-cent carfare and still delivering adequate service.

Confronted by steadily increasing operating costs, the Los Angeles Railway put its case before the State Railroad Commission of California and the Public Utilities Board of Los Angeles with the request that a thorough survey of the system be made. As a result thirty of the leading engineers and traffic experts of the West co-operated with the state and city officials and executives of the railway company in a five months' investigation. In a general way, the report recommended shortening the running distance of several lines, a reduction of the number of cars passing through the congested business district and installation of a number of one-man safety cars, especially in the outlying districts, where shuttle lines were found practicable.

The rerouting was established so as to clear two through-town streets for automobile and pedestrian traffic exclusively. This was done on all of Eighth Street and on Third Street west of Main. As soon as autoists realized the advantages offered for faster movement a marked improvement resulted. Twenty-five per cent of the curves were eliminated, with consequent speeding up of traffic over the more direct routes. The most notable change in this respect was the ending of turns at Seventh Street and Broadway, which was the busiest intersection of the business district and formed a popular outlet for automobiles to the beach resort cities and other suburban points. Abandonment of a few short lines practically duplicating through-town routes was made on recommendation of the traffic experts, who decided no great inconvenience would result from such action.

Forty-five of the one-man cars have been ordered for some time, and it is expected they will be delivered and placed in service shortly. No attempt will be made to operate them through the business zone until patrons have become well acquainted with their mode of operation on the shuttle lines. It has further been demonstrated that there is a vital need for the larger capacity cars through the downtown section. All cars are being equipped with recording fare box. With the extensive changes in routing during the day, the owl cars were continued on the former runs, since they did not have the traffic problem to meet and served a wide territory. On most lines the rerouting permitted a faster schedule, especially through the downtown streets.

It was by no means an easy task to acquaint the public with the changes made in the rerouting. Advertisements of the new routes were published in all the Los Angeles newspapers with the suggestion that the information be clipped out for further reference. Added to this, sixteen-page folders giving the routes and explaining why the state and city officials had recommended the changes were placed on the cars. Many news stories were carried in the local papers.

The report leading up to the establishment of the rerouting system contained some pertinent facts about a street railway's share of street paving. In Los Angeles the company pays for the paving of 19 ft. in the center of double-tracked streets and 8 ft. on single-tracked streets. The State Railroad Commission report points out that from 8 to 10 per cent of the company's gross revenue is required to pay this paving bill. "This," the report says, "is unjust and it is not to the best interests of the city that this total paving expense should be paid by the car riders."

Track Maintenance Problem in Schuylkill, Pa.

THE Schuylkill Railway, Girardville, Pa., has purchased 400 tons of 70-lb. rail, to be used in replacing old rail along its lines. The labor situation is at present holding up the work. Through boroughs where the streets are paved it is intended to use steel ties. Twelve double sets of frogs and switches with 70-lb. rail have also been ordered to replace old layouts. In the track department of this company one of the most serious problems encountered is the undermining of the track structure by the coal mining interests. The track is continually settling without warning and has to be brought back to grade. In one point the track recently settled 4 ft. for a distance of 100 ft. This settlement is sometimes of gradual occurrence and sometimes is very abrupt.

Auto Carrier Competition in California

Heavy Burdens on Railways and Lack of Regulatory Measures on Auto Carriers Make Change Necessary—Legislative Action Probable

BY W. V. HILL
Manager California Electric Railway Association

COMMON carrier automobiles in both passenger and freight service have become an important factor in the transportation field in California. They are competing with electric railways to a serious extent despite the fact that railroad commission, electric railway men and even the auto operators themselves seem to agree that the auto carrier business is economically unsound and in many cases conducted at a loss. California's extensive system of good roads and a climate conducive to automobile travel throughout the entire year have an important bearing on the situation. Whether the electric railways would find it advantageous to use buses as feeders in certain cases may be an open question for some time, but if they do they would expect to give the public the same protection on buses as on cars. If the public wants the railway service continued, and it is granted that the operation of electric railways is an essential service, their investment must be safeguarded and they should be allowed to earn a reasonable return. The situation is summarized in the following:

There are not so many passenger bus companies operating now as there were a year ago, the larger companies absorbing the smaller ones when lack of capital or inefficient management has put them out of business, but the actual number of buses in interurban service is greater. Moreover, the growth of auto truck competition has been very rapid. The average life of the small bus company is short, but apparently new operators are ready to begin fast enough to balance the discontinuations. Through consolidation and extension of their territories some of the bus companies are now doing a gross business in excess of the smaller electric railways.

Operating out of San Diego there are now twenty-five freight trucks and 158 interurban passenger buses, although purely local jitneys are prohibited. In the territory served by the Pacific Electric Railway about two hundred passenger buses are now operating, carrying approximately 20,000 passengers daily. Most of these buses run from the two large bus terminals near the center of the business district. A large percentage of this business could, and in the absence of the buses would, doubtless, be handled by the railway. Of still greater importance is the fact that 1,035 auto trucks are handling freight in the Los Angeles territory, most of these in competition with the electric railway, though less than three dozen trucks have filed application for certificates with the Railroad Commission.

The auto buses have a decided advantage over the electric railways, both in taxation and operation. Aside from the State motor vehicle taxes and the local licenses imposed by some cities, the auto buses have free use of the highways and do not pay the State tax of 5¼ per cent of gross income which the electric railways bear. How serious a handicap the electric railway is under in this regard may be realized from the fact that including taxes, right-of-way, track, overhead construction and, within city limits, paving, it is not unusual for an electric railway to be paying 25 to 30 per cent of its gross income for a road on which to run its cars and the permission to run them there. Both of these the bus acquires for a small fraction of this percentage, so long as it can use gratis the highways built with the taxpayers' money.

Under these conditions and with the high current prices for construction material, it is natural that there would be consideration of whether the electric railway should, under certain conditions, go into the bus business. Particularly in the matter of new territory there is question as to whether service could not be rendered more economically by an auxiliary bus line than by an extension of the track and overhead. On the other hand, in the face of rising gasoline and rubber prices, where track and overhead are now in place, the matter should receive careful consideration before this investment is abandoned and auto buses are bought.

Of late there have been many ill-advised and short lived ventures in the auto carrier business. A goodly percentage of these are ascribed to the policy that automobile distributing houses are believed to have followed, the tendency seeming to have been to finance would-be auto carrier operators even though it was apparent at the outset that the venture involved considerable risk. Under present conditions the automobile manufacturer does not really suffer the whole burden of such losses, because they are charged off on the excess-profits tax, the government being the loser. Moreover, it is considered that there is a considerable advertising value in having a certain make of automobile used extensively in the utility business.

"ROBBING PETER TO PAY PAUL"

Automobiles serving communities that have no other means of transportation should receive every encouragement, but in all cases they should be charged with the same responsibilities required of other transportation utilities. There is an excellent example of robbing Peter to pay Paul in the present system of taking 5¼ per cent of the gross earnings from steam and electric lines for the support of the State and then to use State funds for building highways which the buses use gratis as a right of way on which to compete (free of the 5¼ per cent tax) with the railways.

The highways are being rapidly and seriously damaged by the large buses and trucks and no doubt the Highway Commission will soon be in need of funds to meet heavy maintenance charges. The logical and equitable thing to do would be to impose a special license on auto carriers that are using the highways, the fees collected to be added to the maintenance fund.

Most of the 500,000 automobile owners of California are taxpayers and they are beginning to ask what special rights have been accorded these large auto carriers. The number of accidents is rapidly increasing and the tendency of bus and truck drivers to "hog the road" is such that many drivers of pleasure cars avoid, as much as possible, using roads where the buses run.

Uncalled for competition between interurban electric railways and auto carriers cannot continue. The impending gasoline shortage may help to settle the matter, but regardless of this a readjustment of present conditions cannot be long deferred. As matters stand now, one utility is carrying burdens from which its competitor is exempted. When a definite issue between electric railway and auto buses has been faced, as at Los Angeles,

San Diego and Bakersfield, the elections showed a preference for the electric railway. The issue has now become statewide and legislative action at the next session of the Legislature is desirable and probable. Just what legislation will be passed is problematical, but at the recent meeting of the California Electric Railway Association, as reported on page 1104 of the ELECTRIC RAILWAY JOURNAL for May 29, the railways are working together on the matter through their association and are prepared to present their side of the question and ask for a square deal. The first step probably will be to show the public how serious the present situation is and that if it wants electric railway service continued relief must be given.

In San Francisco, where local jitneys are not prohibited, there were 438 in operation on June 1. These buses are not permitted to compete with the Municipal Railway, but the Board of Supervisors has made no effort to stop them from competing with the United Railroads. Long Beach is experimenting with a jitney company, having sold a fifteen-year franchise for $21,000, the grantee agreeing to pay the city 5 per cent of its gross receipts.

The Railroad Commission, though thus far unable to cope with the auto carrier situation throughout the State because of lack of legislative provisions, has nevertheless shown a very fair spirit. In refusing a recent application for a certificate to operate buses between Santa Rosa and Petaluma, two cities that are now connected both by steam and electric railways, one commission stated that it would "not jeopardize the welfare of a rail carrier unless it is clearly shown that there exists a real public necessity for the authorization of another transportation facility."

However, without explicit laws and ordinances and with no machinery for traffic policing, inspection or control, there are many ways in which the auto carrier can escape regulation. Los Angeles County has a regulatory ordinance that is not enforced; in some counties there is none in effect, and in others licenses costing up to $30 or $40 per annum are required. In the cities there is an almost equal lack of uniformity, some cities having no local licenses and others charging as much as $200 per annum. Thus it is apparent that state, county and city licenses and taxes should and doubtless will at this session of the Legislature be put on an equitable basis. Los Angeles requires a $10,000 indemnity bond on each car, costing $54 per annum. This is another measure in public protection which the railway provides and which the public has an equal right to expect from the auto bus.

Brief-Message Car Cards Prove Effective

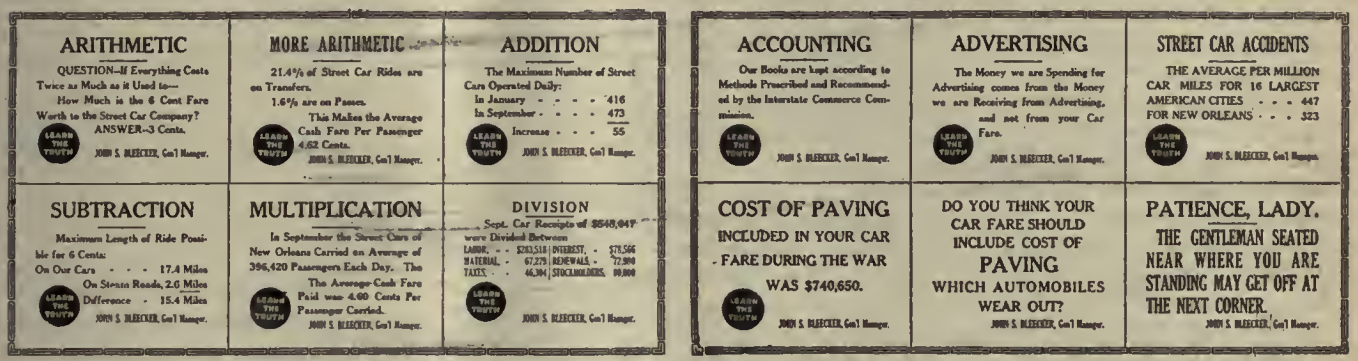
New Orleans Company Has Had Excellent Success with a Very Simple but Unique Character of Publicity

ONE of the first things John S. Bleecker, general manager, set about doing when he took charge of the New Orleans Railway & Light Company for the receiver was to inform the public by "learn-the-truth" publicity just what the conditions were which the company faced. He fully appreciated that he could do nothing without the co-operation of the riding public, so a newspaper and car-card campaign was undertaken. This work came under the immediate direction of William J. Baldwin, who is publicity agent for the company but has the title of assistant to the general manager.

The first work done by Mr. Baldwin was to go to the three local newspapers and frankly seek their co-operation. It was gained on the straightforward basis of "selling" the papers on the policies and plans of the new management for improving the car service, and on the great assistance the papers could render by co-operating constructively with the company for the good of all. The destructive criticism of the papers thereby disappeared to a large extent or at least went on vacation until they could see whether the company would live up to its expressed principles.

Soon thereafter a liberal use of car cards and a small number of full-page newspaper advertisements were put to work. The newspaper advertisements were pretty much the same as have been run in many other cities, making capital, among other things, of the Washington hearings of the Federal Electric Railways Commission. But the car-card publicity used was quite original in character, as noted above. One of these full-page newspaper advertisements brought effectively before the people the improvements made in the service by giving data on the subject and quoting letters from ten prominent citizens who had commented upon the bettered service.

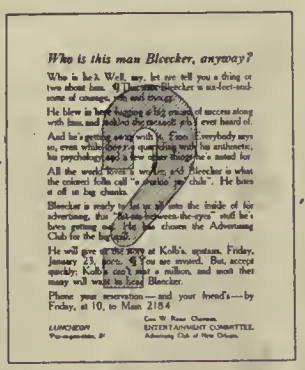
The car-card publicity got out by the New Orleans company has been built around the idea of putting forth just one thought so briefly stated as to be absorbed almost at a glance. In a good many pieces of copy this single thought was so set forth as to give rise to much further thinking. In other words, a simple pertinent statement was often made without drawing any conclusion, leaving it to the reader to make his own deduction. In some cases the answer was perfectly obvious and in



A GROUP OF THE BRIEF-MESSAGE CAR CARDS USED SO EFFECTIVELY IN NEW ORLEANS. ORIGINALLY EACH OF THESE TWELVE PIECES OF COPY WAS ON A LARGE CARD BY ITSELF

others it puzzled the lay people and perhaps thereby added to the interest taken. Sometimes a bit of irony was used to good effect. An example of this is included among the cards reproduced herewith—the one having the heading "Patience, Lady."

The twelve samples of the New Orleans car-card advertisements reproduced with this article give a good idea of the character of the copy used. A natural criticism of it is that it seems to be without object, or that it gives rise to the questions in the mind of the car riders, "What is the company after? What is all this leading up to?" This is what occurred to the writer, and Mr. Bleecker answered the criticism by saying that it *was* without object so far as any propaganda to the public was concerned. But he explained that there was a real object involved, and that was to demonstrate to the receiver and board of directors and to reaffirm his own belief that the public would read publicity concerning the street railway, that it would take an interest in the transportation problem and that it wanted to learn the facts. Having made this demonstration, the way would be paved for a constant publicity program with a definite object in view, if occasion demanded an object.


Who is this man Bleecker, anyway?

THE ADVERTISING CLUB'S ANNOUNCEMENT CONCERNING MR. BLEECKER

At the time of this writing Mr. Bleecker's belief in good publicity had been amply satisfied, for there was evidence on every hand of an unusual interest in railway affairs, and further, a disposition to concede the difficulties of the situation and to give the company a fair chance to work out its problems. Perhaps the announcement of the local advertising club, sent out when Mr. Bleecker had an invitation to address the club, gives as good an idea of the impression made by the company's publicity as can be had. This is reproduced herewith.

Other Publicity Activities

There are several other interesting phases of the publicity work being done by the New Orleans company. Considerable copy has been devoted to courtesy and accident prevention. In promoting courtesy among the trainmen, a book of "Supplemental Rules" was got out for employees and later printed in pamphlet form and distributed to the car riders. This had a fine effect on both public and men, each thereby taking a share in the responsibility for courtesy, although all of the supplemental rules were addressed to the trainmen.

The publicity work was also carried to the movie theaters. The company had several films made up to bring out in an interesting manner many thoughts about the street-car system. These were written along much the same lines as the copy used on the car cards. Eight such films were arranged for and they were shown at practically all theaters during a thirteen-week period.

The daily printed bulletins covering the Federal Electric Railways Commission hearings were sent by the company to a selected mailing list of 840 citizens from all walks of life. After this had been going on for some time some one sent back the bulletin and asked that his name be taken off the mailing list. This gave rise to the idea to write to all persons on the mailing list and ask if they were interested in the news of the hearings and whether they would like to continue to receive the bulletin. About 300 replies came back and 95 per cent of them were favorable and showed a very encouraging interest in the traction problems.

In connection with the many calls upon a street railway company for donations to an endless number of charity endeavors, the New Orleans company has held to the fixed policy that the receiver cannot make any gifts of money, but the company is doing everything possible to co-operate through special car cards, etc., in making all such movements a success.

All of these publicity activities combined have created a very envious interest and understanding in the street railway problems in New Orleans. Mr. Bleecker summed up the results by saying, with knowing exaggeration and yet well illustrating the tendency, that it had given him 420,000 inspectors—that being the population of the city.

Canada Contemplates Increased Electrification

THE Hydro-Electric Power Commission of Canada contemplates the construction of several high-speed electric lines in the Toronto district.* One line would connect Toronto, Hamilton and Niagara Falls, using single track between Toronto and St. Catherines with the exception of two double-track sections, each of 6 miles, in the vicinity of Toronto and Hamilton.

In a report to the commission W. S. Murray, consulting engineer of New York, estimates the cost of the 73-mile line from Toronto to St. Catherines at $17,498,635, with an additional $4,800,000 to cover rolling stock and substations, or a total of $22,298,635. This line would parallel the Grand Trunk Railroad, but, according to Mr. Murray, will not cause duplication because the facilities and location of the present road are inadequate to handle the traffic. Mr. Murray points to the fact that eight American roads are in contact with Canada at this frontier and only one road is available on the Canadian side. He also compares the Washington and Baltimore line, which has about the same distance with parallel roads, six tracks of steam and two tracks of electric, and shows that the present Canadian roads carry a density of traffic three times as heavy as the American installation.

Another radial line from Toronto to Bowmanville is proposed, as well as one connecting Hamilton, Galt, Guelph and Elmira.

The recommended scheme is for high-speed traffic on these radial roads out of Toronto with a terminal in Toronto connected with the city lines. The commission has the power to modify lines in existence and purchase others so as to operate at high speed in city streets. The district touched by these radials has had a very heavy industrial and residential expansion and the lines are expected to furnish more adequate transportation facilities. The City of Toronto will take over and operate the existing city lines in December, 1921, and Mr. Murray recommends the purchase by the commission of other radial interurban lines out of Toronto in order that all development may follow a co-ordinated plan.

*See ELECTRIC RAILWAY JOURNAL, April 24, page 864.

Merchandising Transportation

Attitude and Appearance of Employees an Important Item—Telephone a Direct Competitor of Electric Railway—Publicity an Essential Factor

By W. H. BOYCE
General Manager Beaver Valley Traction Company, New Brighton, Pa.

TRANSPORTATION is a commodity and to merchandise transportation properly we must have satisfied customers. To this end we must have clean, courteous, obliging trainmen, operating clean, well-painted and well-maintained rolling stock over a comparatively smooth roadbed at intervals as frequently as experience proves the available traffic will warrant and at a speed as great as operating conditions will permit, "safety first" being considered.

At times, owing to conditions, our service has been so unsatisfactory that certain individuals were led to adopt other means of transportation, sometimes on account of the unreliability of the service, sometimes on account of the crowded condition of the cars, sometimes on account of improper maintenance of rolling stock or roadbed, discourtesy of trainmen or officials or increases in fare, which the short-distance rider was unwilling to pay but made necessary by changing conditions.

We have in the past overlooked many opportunities for keeping the patronage that we had and for increasing our patronage. We must merchandise our transportation after the manner of the merchandising of other commodities. This may be done by correcting as nearly as possible the existing evils already mentioned, by the use of newspaper and car-card advertising, by offering special rates for off-peak riding, which probably can be done in some localities in conjunction with motion-picture houses or mercantile establishments, etc. The zone system in some cases will bring results, the zones being made as short and the single-zone fare as low as possible, due regard being given to the difficulties of administering such a system and to the frequency of the fare collection.

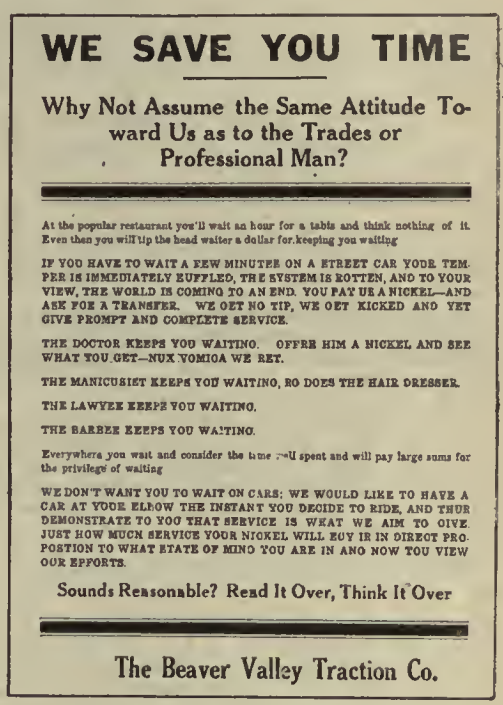
We must also get closer to our customers. In the past it has been rather generally the practice to give our customers what we felt they needed, or what we could get away with. Now we must give them not only what they need but what they want and are willing to pay for. While conditions are not exactly comparable, there is much to be learned from the successful dry goods merchant, who has at the lingerie counter the type of garment that his class of trade demands, or from the catering of the motion picture proprietors to the tastes of their patrons. We can get closer to our customers in many ways—through the advertising already mentioned, through connection with civic movements of all kinds and through association with our customers in all places and under all conditions possible. It is highly important that we take an active interest in the work of chambers of commerce, rotary clubs and other organizations, civic, social and fraternal.

We must not overlook the fact that we are competing with the privately owned automobile, as well as the jitney, and with mail-order houses, telephone companies and all kinds of delivery systems. When a person sits down at home and writes an order to a mail-order house rather than go into the local market and make a purchase a potential street railway cus-





SAMPLES OF ADVERTISING PUBLICITY USED BY BEAVER VALLEY TRACTION COMPANY



tomer is lost. This is the case when the customer calls up a local dealer and orders his supplies by telephone. The business that is thus lost is considerable.

Data Indicate That Telephone Is Direct Competitor of Electric Railway

In December, 1919, the companies which I represent put into effect a zone system with shorter zones than those previously used. Formerly some of the zones had been as long as 6 miles, the minimum fare being 7 cents. At the time the change was made the territory was divided as evenly as possible into 2-mile zones, due consideration being given to local conditions, with the minimum fare reduced to 5 cents. A check made of what was actually occurring prior to the time of splitting up the zones showed that if patrons continued to ride as before, after the changing of the zones, the new rate of fare would produce an increase in revenue of approximately 20 per cent. Our December receipts actually showed an average daily increase of 6.22 per cent as compared with the November receipts; January as compared with December showed a decrease of 4.18 per cent; February as compared with January an increase of 0.35 per cent and March as compared with February an increase of 14.13 per cent.

The following inquiry addressed to the Bell Telephone Company under date of January 23 is of interest in this connection:

From records that you keep would you be able to give me any information on the following:

Does a change in the street car fare make any apparent difference in the number of telephone calls generally, or those to or from any particular firms?

Aside from purchasing from grocery stores, meat markets, bakeries, etc., the daily necessities of life, is there any considerable quantity of telephone purchasing done, or do you have any means of determining that, either as a local specific case or from national data?

I realize that you may not have any information directly along this line, but you can see what I am driving at, and if you have any information that will shed light on the relative positions of transportation and telephone companies when it comes to serving the shoppers, I would much appreciate having same.

This inquiry brought the following response from the Bell company:

Replying to your letter of the 23d inst., I regret to advise that I am unable to furnish information requested.

I might say, however, that the traffic load has increased very much during the past two months. We are unable to give any particular reason for this increase in telephone calls, as it does not apparently apply to any particular locality, but seems evenly distributed over the entire valley.

Inquiry under date of April 8 developed the fact that the telephone company experienced an increase of 35 per cent in traffic load, about evenly distributed among its local exchanges, for the months of December, January and February, while for the month of March the traffic load showed a decrease of 10 per cent. It will be recalled that in December, January and February we suffered a decrease in traffic, while in March our traffic increased materially. This would indicate direct competition between the railway and the telephone. This illustrates the fact that it would pay all of us to learn more of what is going on on the sidewalks and through the telephone exchanges and delivery systems, rather than to confine our inquiries solely to what is occurring on the car.

Our companies have for the past eight years done more or less advertising in the way of car cards and in the daily newspapers. This has, without a doubt, had an effect upon the merchandising of our transportation by reason of acquainting the public with the operating problems and difficulties which we must overcome. To these patrons would give little thought without having the facts called to their attention by the operating company. We have, through meetings with the trainmen, through letters sent to the trainmen and through our service code attempted and have accomplished some things in the way of making our trainmen realize that we are dependent wholly upon the good will and patronage of the public. A few extracts from our service code may serve to illustrate this:

Increasing business on the street cars may sound funny to you, but it can be done. Every time you run past an intending passenger you create a feeling that results in his walking.

Every time you are late, people walk.

Every time you miss being at the depot stop when the train comes in people walk.

Every fare we lose counts against you, as the fares pay your wages, and I get mine from the same source.

Amalgamated Association Believes in Merchandising Methods

We believe that the international officers of the Amalgamated Association of Street and Electric Railway Employees of America, too, now realize that there is something to the side of merchandising of transportation. In the November, 1919, issue of the *Motorman and Conductor* the following four paragraphs appeared on the editorial page:

A merchant employs clerks to sell the line of goods in which the merchant is dealing. Not a very unlike employment to that of street car conductor.

As a general proposition the salesmen on a street car whose business is to sell transportation gets better pay than the average store salesman. His craft is more effectively organized.

What would be a street car conductor's opinion of a store clerk who refused to let him enter the store to make a purchase? Then can it occur to the conductor that this same opinion is formed of him in the minds of prospective passengers in whose face he shuts the door of his car?

Let the street car conductor assume the role of a merchant whose clerks are inattentive to prospective patrons. What type of clerk would he presume he had? How long would he retain them in service? Assuredly, he employs them to sell his goods and not to drive prospective customers from his store. Yet the conductor holds a position identical with the store clerk. As a merchant, he would keep in his employ the live, efficient clerk.

Publicity stands alone in the question of merchandising. The type of publicity to be employed is the only thing necessary for consideration. Publicity itself is a necessity. Why not consider the advisability of a national campaign, setting forth the necessity for the street cars, their part in the community life and the benefits resulting to the community from their existence? Would this not be one way to help break down the present prejudice against public utilities? Would that not be a way to merchandise transportation? Why not a central bureau for the preparation of publicity material tending to set forth the advantages to the community of having an adequate street car service? The good to be accomplished by such a plan is unlimited.

A report from Japan states that a trackless electric car company has recently been organized at Osaka, for the purpose of providing trackless car service in various parts of the country. This is the first project of the kind in Japan.

Supplying Repair Parts to Shops

Canadian Railway Replaces Wornout Supply Car with Auto Truck—Sends Salvage Car Monthly Over Interurban Division

By W. G. Murrin
Assistant General Manager British Columbia Electric Railway, Vancouver

THE British Columbia Electric Railway operates 302 miles of city and interurban lines with a maximum distance between terminals of 80 miles. This includes three city systems, three connecting interurban lines and one long interurban line extending 64 miles eastward from New Westminster. The mileages of the various divisions are: Vancouver city division, 104; North Vancouver division, 10; New Westminster city, 18; first district intercity, 17; second district, 32; third district (Fraser Valley), 64; fourth district, 12; spurs, sidings and carhouse tracks, 45.

The accompanying map shows the Vancouver and New Westminster city divisions and two of the most important intercity lines of the interurban division. Some 11 miles of city line are in North Vancouver, across the harbor from Vancouver, and the 64-mile Fraser Valley division, with five interchange connections with transcontinental steam lines, begins at New Westminster. The bulk of the freight business is done in this section, called the third district, and in the section made up of the double-track line from Vancouver to Marpole, together with two single lines from that point, which constitute the second district.

The motive-power equipment for these lines consists of 880 cars of city and interurban passenger, express, locomotive and freight types. These, together with such freight cars from foreign lines as require attention, are maintained by the mechanical department. Motor equipment is distributed to seven carhouses. The Vancouver city division, with 220 cars, occupies the Prior Street and 13th Avenue shops; Kitsilano (also in Vancouver), takes care of fifteen cars operating on the second interurban district, and fifteen cars are at North Vancouver. The remainder of the equipment, with the exception of such trains as spend the night at Chilliwack, the eastern terminus of the third district, are looked after at New Westminster. At present there are in service 237 city passenger cars, sixty-one interurban passenger cars, eleven express cars, four locomotives and nineteen service motor cars. The freight equipment comprises 410 standard cars and a number of maintenance-of-way and construction units, all of which, together with a considerable and varying number of foreign cars, are scattered over the interurban lines.

Facilities for Making Repairs

Light repairs are made at the different change points and the overhauling and heavy repairs are done at the repair shops in New Westminster, where there is a large sorting yard. All freight equipment is handled under the American Railroad Association rules. The general repair shop and stores are at the Prior Street yard in Vancouver, which is centrally located. Daily and other periodical inspections, and light repairs, such as the replacing of armatures, bearings, trolley wheels, brake-shoes, control equipment, etc., are carried out at the other carhouses. Truck and wheel overhauling, body repairs, painting and general overhauling are all done at Vancouver, where suitable machinery is available. Many of the repair parts which can be made up in lots more economically at one time are made at Vancouver and supplied to the other shops as required, a subsidiary store being maintained at each carhouse. This system is made practicable by a regular weekly transfer of supplies between the general shop and the different carhouses, which was done until recently by a supply car. This car was of an old type with flat body which had ample room for shipments, but it reached a condition where repairs would have cost more than the car was worth. It was therefore retired and replaced by a 2-ton motor truck, good paved roads to all points being available. This supply truck leaves the Prior Street general shop every Thursday, calling in turn at 13th Avenue, Kitsilano and New Westminster, returning after a final call at the New Westminster freight shed, where materials for points along the Fraser Valley line are left to be taken by the regular express trains. Supplies for North Vancouver are taken by trucks by way of a ferry at intervals as necessary.

At each carhouse all defective or damaged material is collected and replacement parts are left, together with



MAP OF BRITISH COLUMBIA ELECTRIC RAILWAY SYSTEM

1. General repair shop, Prior Street. 2. Vancouver carhouse, Thirteenth Avenue. 3. Interurban carhouse, Kitsilano. 4. Carhouse and shop at New Westminster. 5. Freight repair tracks.

such other supplies as have been requisitioned by the foremen and are shipped from the general stores. Armatures are shipped in special boxes equipped for easy handling by slings and cranes. Each armature has a tag attached to it on which are indicated the defect found and the reason for sending it to the repair shop. After arrival at Vancouver the equipment is tested and repaired and it is then returned to the carhouse or another piece in good repair is substituted. The repair tag, with details of all repairs made, is forwarded to the car-record office at the head office. Other defective apparatus is accompanied by a "repair or replace" work order. The material to be repaired or replaced is distributed to the Vancouver shop and the original of the order, signed by the foreman originating it, is returned to the issuing foreman with the necessary material. No material is taken by the supply car unless accompanied by such work order or shipping bill. Thus, every piece of apparatus sent in by outside foremen is accounted for and either returned, repaired or turned in to the stores.

Some of the Advantages of the System

One advantage of this plan is that it enables the foreman in each repair shop to accumulate pieces for repair until a man or machine can do the work in quantities and so reduce the unit cost. The saving as com-

pared with doing this work at the outside shops in many cases is as much as 50 per cent. For example, at the freight repair track a large number of handhole covers, sill plates, steps, etc., are used. The manufacture of these formerly took most of the time of the blacksmith employed at the repair track, and when made they cost much more than when forged in quantities under a power-hammer with suitable dies at the general repair shop.

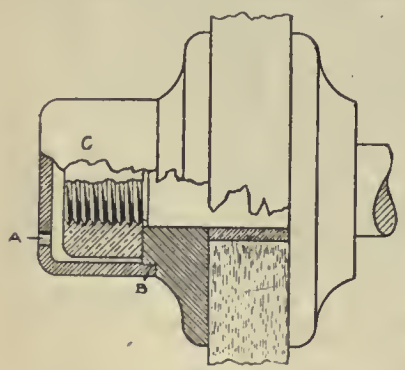
The foreman at each shop now knows that he can depend on getting his supplies regularly by the supply car and assembles the material which is to be returned, makes out his work orders and ships all equipment. At the same time he replenishes weekly his subsidiary stores, which are kept in sufficient quantities to insure efficiency without excessive stock. All material necessary for such emergency repairs as can be economically made at the outside shops is kept on hand. In case of serious breakdowns, when it would be necessary to return the car complete to Vancouver, the damaged material would of course be loaded on the car and forwarded with it.

Generally speaking, it has been found that this regular weekly distribution of supplies, with its simple but efficient system of ordering and receiving them without the work of making out way bills, as would be necessary if shipped by regular freight or express, has relieved the foreman of much unnecessary work and worry and has resulted in improved efficiency and economy.

A similar scheme is in effect on the interurban division, which has produced surprising results. For transporting the material, a car is attached to the way freight which makes trips once a month over each of the interurban lines. This gathers up all material lost or dropped along the right of way, such as brakeshoes, bolts, nuts, trolley poles, etc. Frequently, on inspection, something is found missing from a car, with no reports as to what became of it from the train crews. Later, the missing parts will come in on this "pick up" car. The aggregate value of material thus salvaged in a year more than repays the cost of operating this car.

Safety Cap for Grinder Nut

THE weekly news letter of the National Safety Council for May 10, 1920, gives a description of a cap for covering the nut on grinder spindles, as devised by C. R. Underhill of the Peerless Wire Fence Company, Adrian, Mich. In the accompanying illustration the cap *C* is fastened by a thread at *B*, which is cut in the washer on the spindle. This must be left hand or right hand, the same as on the spindle. A pair of holes are provided at *A* for the use of a spanner wrench in screwing the cap on or off. This should be valuable where the work must be done on the side of the wheel where the nut is located and where it is impossible to provide a hood with a side piece to cover the nut.



SAFETY CAP FOR GRINDER SPINDLE NUT

Frogless Switch Improved in Design

THE frogless switch made by the Walls Frogless Switch & Manufacturing Company, Kansas City, Mo., was pictured and described briefly in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 6, 1917, page 44. Since that time the design has been greatly improved to assure absolute certainty of setting. The operating mechanism has also been redesigned as seen in the accompanying illustration. As now constructed, the section of rail at the frog is either mechanically or electrically interlocked with the switch signal so that the clear signal cannot be given until the frog has been locked in one position or the other.



INSTALLATION OF FROGLESS SWITCH ON THE KANSAS CITY, CLAY COUNTY & ST. JOSEPH ELECTRIC RAILWAY AT NORTH KANSAS CITY, MO.

The operating mechanism now comprises a four-arm bell crank mounted underneath a ¾-in. x 20-in steel plate on which the frog is mounted. Two arms of this crank are connected to two rods from the switch stand or signal tower and the other two arms are connected to two slide bars, one on either side of the rail. These bars engage with two steel rollers in such a manner that as the bars slide along the rail, a cam or wedge action between bars and rollers causes the rail section to shift from one position to the other. It is claimed that the wear resulting from the shifting of the frog from one position to the other is exceedingly small, and that it can be taken up by the use of slightly larger rollers after long service if a certain amount of play develops.

Drum-Contactor Controllers

THE Westinghouse Electric & Manufacturing Company has perfected a design of manually operated drum-contactor controller which embodies practically the same principles of operation as its magnetic-contactor type controllers. They are used for starting and adjusting the speed of shunt, series compound-wound motor by cutting in or out resistance in series or parallel with the motor armature. The contactors are operated by cams mounted on the controller shaft and line contactors which open and close the main line circuit and are protected by magnetic blowouts.

Each contact element is complete in itself and can be removed as a unit. The stationary and moving contacts are identical and are interchangeable with those of the company's auto starters and magnetic-contactor controllers.

All controllers are drilled and tapped for both a horizontal and vertical handle and can be supplied with either. The controllers will operate when mounted in any position, as the contactors are spring-actuated and their operation is not affected by gravity. Controllers for use with crane hoists regulate the speed of the motor while lowering by dynamic or regenerative braking. They are also designed so that if there is not sufficient weight on the hook to rotate the motor and drum the motor will assist in lowering.

Machine for Filling Snow Sweeper Brushes

Machine Built in the Shops of Cleveland Railway Has Effected Marked Economy in the Filling of Rotary Brooms

IT USED to take one man an hour and a half to put the rattan in a segment of the rotary brushes used on snow sweepers. Now the Cleveland Railway Company has designed and built a machine at the Harvard shops which makes it possible for one man to fill ten brush segments or more in an hour. The work which has made this economy and the ability of the shop to keep ahead of replacements during long snowstorms possible involved not only the design of the brush machine itself but also a redesign and rebuilding of the brush holders on the sweepers.

The brush machine consists of an air-operated press having a bed and beam designed especially for making these brush segments. A 20-in. x 20-in. cylinder, which was available, though its 7-ton capacity at 95-lb. air pressure probably is greater than needed, is bolted through the concrete floor above the basement where the machine is installed. A special wooden beam is attached to the piston and this may be raised and lowered by means of the shop air pressure controlled by an ordinary trainman's valve, two 4-in. x 4-in. oak timbers forming the vertical guides for the beam.

In the bed of the press is a groove of the proper size and shape to receive a galvanized pressed steel shell which forms the back of the completed brush segment. A layer of rattan of 30-in. lengths is then laid evenly across the bed of the press and, by means of a guide board at the back of the bed, centered over the shell.

Then a maple bar 2 in. wide at the top side, 1¼ in. wide at the bottom side and 2 in. deep, which has been fitted with ten cast brass hooks, is fastened to the bottom of the beam of the press and held in position by means of a short length of chain at either end. Air is then admitted to the cylinder, and as the beam comes down it forces the rattan down into the shell and turns the ends upward on either side of the maple bar. When the piston has traveled its full length downward the brass hooks on the bar spring over the rounded or rolled edges of the shell, engaging it and holding fast. Possibility of these hooks becoming disengaged from the shell is overcome by putting four large cotter pins behind the shell in holes in four of the hooks cast with a projection to extend through slots in the shell. This completes the making of one brush segment. If it sticks in the groove in the bed of the press the lever seen at the left of the accompanying photograph provides a cam action, one at either end of the groove, which very quickly pries the brush up and out.

Steel pins placed opposite each other along the groove in the bed of the press serve to separate the rattan so that there will be space for the hooks on the maple bar to move down through the rattan and engage the shell. It is claimed that there is less leakage of the rattan and that the brushes have a longer life when made with this machine than when made by hand, probably due to the elimination of malleting the rattan into place and to the fact that the bend in the rattan is not quite so sharp. The rattan is of course softened before it is made up into the segments by steaming it in a 30 in. diameter by 36-in. high cylinder connected to a steam hose. Another advantage of the machine is that it is possible to use up short pieces of rattan by mixing them in with the pieces of regular length.



PRESS FOR MAKING SWEEPER BRUSH SEGMENTS, SHOWING SHELL, BAR WITH BRASS HOOKS AND RATTAN IN PLACE READY FOR PRESSURE TO COMBINE INTO A BRUSH SEGMENT

The shell which forms the back of the brush segment is made out of one piece of sheet steel, except for the two ends, and bent into a U-shape with the edges rolled. The ends of the shell are filled in with brass castings on which there are three ears for riveting the end piece to the steel shell.

The brass hooks on the maple bar which forms the inner backbone of the brush are shaped in the form of a loop with the hooks extending out from the top side. These are put in place by slipping them over the end of the bar. Four of the ten hooks per bar also have a projection at the bottom which, as previously mentioned, extends through the shell and permits of the cotter pin or key being inserted to keep the shell and maple bar from separating.

In order to make use of this new type of brush segment it was necessary to provide a new means of fastening the segments onto the rotary brush holders. This was accomplished by substituting for the old holders three castings of similar but different design for holding the two ends and centers of the four brush segments making up a brush. The casting at the outer end of the brush provides four pockets into which the backs of the four segments fit. This casting has a flange which prevents the segments from shifting sideways and a rim which prevents them from flying out centrifugally as the brush revolves. The center casting provides simply four pockets in which the four segments rest, bracing them as the brush rotates against the snow, but this casting has no flange or rim. The casting at the inner end of the brush also provides four pockets for the brush segments and has a flange for preventing any lateral movement of the segments but no rim. At the center and inner-end casting a split band hinged at one side and bolted together at the other is used to clamp the four segments in place.

To remove a segment it is only necessary to remove the two bolts holding these two clamps, open the clamps and, with a radial pull at the inner end of a segment and a slight lateral movement toward this end, lift the segment out of the holder. A new segment is then inserted by first putting the outer end in place against the rim of the outer casting and by moving the other end toward the axis to its position in the center and inner-end casting.

Association News

I. C. C. Brief on Rates

AS CHAIRMAN of the committee on national relations of the American Electric Railway Association, Charles L. Henry on June 28 presented a statement to the Interstate Commerce Commission on the position of the electric interurban railway companies in connection with the proposed increase in rates, both passenger and freight, by all carriers coming within the provisions of section 15a of the interstate commerce act.

In the opening part of his statement, Mr. Henry pointed out that the commission has not yet determined whether electric railroads or any of them come within the provisions of this act, so he confined his arguments to the effect of rate increases of railroads in general on the electric railways. The apparent policy of the steam railroads at the present time, he said, is to increase their freight rates only, leaving their passenger rates without increase and absorbing by their freight increases a necessary and certain loss in passenger operation, but the establishment of this practice and the necessary inclusion of electric railways within it would be unfortunate for the latter. More than 60 per cent of the electric railways derive from 60 to 85 per cent of their revenue from passenger business, so that they cannot absorb in 15 per cent of their gross business substantial losses incurred in 85 per cent of it.

Mr. Henry called particular attention to the loss in the so-called suburban passenger business of many steam railroads, citing as an illustration the low rates at which the passenger business on the steam railroads in the Chicago territory was carried. On five of the principal steam railroads in this territory an investigation made in 1919 showed in 1918 a loss of $1,685,000, exclusive of operating expenses for the use of terminals and equipment, for taxes and for depreciation. With all legitimate items charged in, except depreciation and traffic expenses, the loss in 1918, according to Mr. Henry, was $5,800,000.

Electric railways, Mr. Henry said, are facing the problem of increased expenses, more particularly for labor and material, and, in his opinion, unless passenger as well as freight rates are increased the declared purpose of the transportation act will fail and one substantial branch of transportation in the United States will be forced into inefficiency and finally into insolvency.

Information Recently Compiled

THE following reports and compilations have been prepared by the bureau of information and service of the association:

Report on possibilities of increased fares and effect of other forms of competition.

Summary of power station costs per kilowatt-hour, segregated on the basis of fuel, labor and maintenance for a number of railway properties.

Life of railway motor wearing parts, a summary of replies to data sheet No. 199.

Experience of railway companies and equipment failures due to recent severe winter, a summary of replies to data sheet No. 202.

In addition, the standard compilations on wage rates of trainmen and cities having increased rates of fare have been brought up to date.

The report on cost of living studies will also be maintained up to date hereafter and will include the latest reports and index numbers of the various national agencies, showing the changes in cost of living and wholesale and retail prices of commodities.

Letter to the Editors

Infringement of Contactor Patents

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KY., June 24, 1920.

To the Editors:

In a recent issue of your paper you published an article describing an overhead trolley contactor made by an electric railway for its own use in connection with the operation of a highway crossing signal. The contactor described is substantially like the contactor made by the Nachod Signal Company and covered by United States patents, dated May 18, 1909, and May 9, 1911.

Electric railway managers should know that the manufacture of a patented article by the railway itself, even for its own use, is illegal and constitutes infringement. In some cases manufacturers hesitate to institute suits on account of the good will of the customer and because the amounts involved are not large, but the duplication of patented articles is manifestly unfair to those who put their time, energy and resources into the development of such devices and it will retard their design and manufacture.

CARL P. NACHOD, President.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

New Orleans Men Strike

Went Out Just Before Holiday in Effort to Enforce Compliance with Their Demands

The trainmen of the New Orleans Railway & Light Company, New Orleans, La., went on strike on July 1. The men lost a great deal of public sympathy by their arbitrary action in voting to strike after the heads of the commercial bodies, financial institutions and labor organizations had appealed to them to remain at work until the pending difficulties could be looked into and measures of relief reached by the intervening business men.

Receiver Through with Union

The men even neglected to make answer to the communication of the business men appealing to them to defer taking drastic action until time had been given the public to look into the merits of the controversy, namely, a wage of at least $150 a month for platform men, an eight-hour day and six days' service a week. Subsequently, the men approached the citizens' committee with a proposition for a hearing, but the request was denied them unless the men voluntarily returned to their work and awaited the investigation that had been promised them by the committee. Receiver O'Keefe at this juncture announced that the men would be restored to their positions, quite cheerfully, if they had not given offense to the company and were competent, but they would have to make application as individuals. He was through with the union.

Then followed an order from Rufus E. Foster, Judge of the New Orleans District Court, in which he commanded the receiver to resume operation, laying down certain rules which would make for an adjustment of the trouble after resumption of traffic. In this order the union was not specifically mentioned.

Judge Foster on July 5 again advised the men to go back to work. He said they would be restored to duty by the receiver, no discrimination being made against the union. He added that he would recommend the receiver to apply to the Commission Council for an 8-cent fare. The Commission Council planned to meet on July 6, and it was expected that body would take the matter up for consideration provided the men had resumed work.

Judge Foster's efforts to settle the differences amicably have been disregarded by the union and the strike was still in progress on July 9. The men now are willing to drop the matter of a wage increase if given a contract at the old rate pending an investigation by a committee of citizens. The receivers, on the other hand, demand the men return to work by July 12 on threat of forfeiture of deposits and positions. It is alleged that the Central Trades and Labor Council will take up the matter of ignoring the union. Conditions are improving daily.

In 1915 the maximum wage paid the trainmen was 24½ cents an hour. Since then wages have been increased 73 per cent. The receiver offered an increase of 22 per cent, making a total of 108 per cent increase since 1915 with which to meet an increase of 93 per cent in living costs in the South, according to United States Government reports. The additional increase offered by the receiver was based on an increase in fare from 6 cents to 7 cents or 8 cents. A fare of 10 cents would be necessary to comply with the demands of the men.

$5,000 for a Car Design

Engineers and others possessing the requisite technical knowledge are invited by the County Council of London, England, to submit designs for a new type of electric car for its tramways. The competition is open to persons of any nationality. Whether or not you are a resident in Great Britain you may enter the competition. No person in the service of the Council will be eligible to compete.

The designs will be judged by A. L. C. Fell, general manager of the council's tramways, and an engineer nominated by the President of the Institution of Civil Engineers. The conditions of the competition provide for the award of a prize of £1,000 to the winner.

The designs accompanied by the necessary reports, specifications, etc., must be delivered at the competitor's own expense not earlier than Nov. 1 and not later than Nov. 30, 1920. Applications for conditions, plans, etc., relating to the competition should be addressed to the General Manager, London County Council Tramways, No. 23 Belvedere Road, London, S.E.I.

On the payment of a sum of two guineas competitors will be furnished with a general drawing of the type of car at present in use on the London tramways system and the more important particulars relating thereto. This amount will be returned to each competitor who submits a bona-fide design and does not subsequently withdraw the same and also to any person who, on the receipt of the conditions, etc., decides not to compete and returns the copy of the drawing, etc., within two weeks.

Ten-Cent Wage Increase

Men in Davenport Awarded Advance By Majority of Arbitration Board

Increased fares over the present 7-cent charge will be necessary to meet the increased labor cost saddled on the Tri-City Railway, Davenport, Ia., by a board of arbitration which returned a finding for a 16⅔ per cent increase in the wages of trainmen last week, President B. J. Denman of the traction lines states.

Report Not Unanimous

The arbiters were not able to return a unanimous report. A majority report signed by Charles Reagan, editor of the *Tri-City Labor Review*, and Franz Swanson, city sexton of Moline, Ill., held the men were entitled to a 16⅔ per cent, or 10-cent an hour, wage increase. The old maximum scale was 60 cents an hour. The new maximum is 70 cents an hour and retroactive to June 1.

The full scale calls for 60 cents the first six months, 65 cents the second six months and 70 cents for twelve months and over. The old scale was 54, 57 and 60 cents an hour. Three of the shop trades are also increased, curve and switch tenders from 44 to 50 cents, armature helpers from 48 to 50 cents, car placers from 49 to 50 cents an hour. Sixteen other shop and track crafts are left at the old scale.

The shop crafts that did not come in for the increase are asking a readjustment and it is possible that the total increase will be spread pro rata throughout the entire union membership. This is a matter for the union and not for the company to settle.

The 70-cent scale applies to both the city and interurban lines of the company. The men's original demands were for $1 an hour on the city lines and $1.05 an hour on the interurban lines.

Third Member Against Increase

The third member of the board of arbitration brought in a minority report which holds the trainmen not entitled to an increase unless one-man cars are installed, in which contingency he gives them a flat 5-cent an hour increase.

This minority report was submitted by C. E. White of Deere & Company, Moline, Ill., an experienced executive in manufacturing. He stated in his finding that there is no justice in "a course that will compel the people to pay this advance (in fares) whose yearly income is less than that of the men in question" (the trainmen).

Preparing for Toledo Vote

Brief Review of Traction History Leading Up to Vote Which Is to Be Held on Aug. 10

Citizens of Toledo, Ohio, are facing a municipal ownership plan of acquiring and building a new transportation system when they go to the polls on Aug. 10. This is the only solution that has been laid before the people since the famous "ouster" proceedings nearly a year ago brought the battle of a quarter century to the front as most important of Toledo's civic problems. A commission, appointed by Federal Judge John M. Killits, drew up the present municipal ownership plan, which was passed by Council in twin ordinances, one providing $3,000,000 with which to acquire and $4,000,000 with which to construct a transportation system.

THE plan of the commission, not written into the ordinances but freely circulated, is to use the proceeds from these bond issues to obtain an auxiliary motor bus system at first, then condemn the choice lines of the present railway system, tell the company to remove the others, and proceed to add extensions and build a new system.

General Credit Bonds Planned

The bonds are thirty-year 6 per cent general credit bonds having the entire taxing power of the city behind them. Council is authorized to spend the money, having more or less *carte blanche* authority granted by the ordinances.

A cost-of-service plan was also drawn to be submitted at the same time as municipal ownership, but the railway officials were unable to agree on valuation with the members of the commission. The completed ordinance was filed with Judge Killits. He may submit it to Council with a valuation agreeable to all parties this coming week. It cannot be voted upon at the same time as the municipal ownership measure if that action is taken.

The coming election will mark one of the possible terminations of a long struggle between the city and the Toledo Railways & Light Company. The Doherty interests took over the properties at Toledo in 1913 after a few of the franchises had expired. There had been other franchise negotiations on for some time in an attempt to get renewals of contracts. When all the grants had expired, the Toledo Council passed a 3-cent fare ordinance which the company failed to recognize. This later furnished the grounds by which the case was taken into Federal court and the company was authorized to collect adequate fare and the car riders were assured of service through a fund administered under the direction of the court. The court still maintains some of the jurisdiction held by the old case.

Railway Problems an Old Story

Several city administrations have promised to settle the railway controversy and provide extensions for the growing parts of the city. It was the ambition of Mayor Cornell Schrieber which brought on the famous "ouster" ordinance last November. At that time the people ratified an ordinance ordering the railway from the street. When the company obeyed the city asked to have the cars brought back.

Leading up to the vote on Aug. 10, at which time the municipal ownership ordinance will be submitted, the significant steps in the process of settlement may be summarized as follows:

During the operation of the ouster ordinance the company circulated petitions to initiate a Tayler-plan grant. They were freely signed, but the measure was never submitted.

Judge Killits appointed two commissions to submit to the people two plans—one a cost-of-service measure and the other providing for municipal ownership.

The railway lent to the city a fund of $25,000 with which a valuation might be made. Service Director Goodwillie with Messrs. Riggs and Ballard turned in a valuation of $7,111,336 based on 1914 prices and recommended the city to stand for this price on the property. The valuation they offered at present prices was in excess of $12,000,000.

In February the city attempted to have passed in the State Legislature a bill known as the Brach Bill granting to cities the specific right to use general credit bonds to purchase utilities. This was passed by the House sixty-seven to six, but was lost in the State Senate.

In March of the present year a test case was brought before the Supreme Court to determine if cities under their own charters had the privilege of issuing general credit bonds to buy transportation systems. The court decided that cities had the right, and the Toledo commission prepared to write an ordinance providing for municipal ownership of the street railway system.

Meanwhile the members of the cost-of-service commission had been hard at work and were jockeying with the price of power, valuation, maximum fare and other provisions. A tentative draft was objected to in writing by Mr. Doherty.

Road Offered by Owners for $11,000,000

Mr. Doherty offered to sell his lines to the city for $11,000,000 on a time payment plan, in answer to a request of the municipal ownership commissioners. He wanted 20 per cent in cash.

April 3 was the date of the second suspension of car service when a strike of employees tied up the system. The company had been collecting 6-cent fares with 2-cent transfers previous to this time. When the platform employees and electrical workers asked increases from 42, 44 and 46 cents an hour to 54, 56, and 60 cents an hour, the company replied that a fare increase was necessary. The cars were operating under the joint auspices of the federal court and the ordinance suspending the ouster. Council refused to grant fare increase. At the end of four days, Judge Killits ordered the cars to resume with 7-cent fare, 2-cent transfer, tree tickets for 20 cents and the increase for the employees. He provided the alternative of appointing a receiver and operating the lines himself. David Friday, of the University of Michigan, had audited the company's books and told the city that the increase was necessary.

An inquiry into the affairs of the Rail-Light was planned by the court, but neither the city nor the company made any application for a hearing.

On April 30, the last day for the cars to run under the agreement of Council and federal court, the company filed a cross-bill in the court asking for 10-cent fare, 2-cent transfer, and statement of the company's rights on the streets. This case has never been heard by the court. It may come up on thirty days' notice by the company. The petition says the property of the company is worth $15,000,000; it declares the Miller public utilities abandonment law of Ohio unconstitutional, and asks that the company be allowed to remove its equipment from the city if the 10-cent fare is not granted as asked.

Council immediately passed a $20,000 fund to hire legal and engineering advice in a fight against the 10-cent fares. Socialists in Council opposed the expenditure of any money in fighting the company.

The municipal ownership commission announced that it would recommend the purchase by the city of $2,000,000 of motor buses so that a system of transportation would be available in case the railway did cease to operate at any time.

Valuation was agreed to be the final issue in the cost-of-service plan. It never was agreed upon. Mr. Doherty offered to agree upon $8,400,000 if all other points were yielded and full support was given by all people. Otherwise he asked $9,000,000. The Milner commission would not go beyond $8,000,000. The disagreement was final and the ordinance was delivered over to Judge Killits, who appointed the commission.

The ordinances offered by the municipal ownership commission were submitted to Council and passed twice to conform with charter regulations and state statutes. They will go on the ballot Aug. 10.

The issue seems not to be for or against buying the present railway system. It appears to be the aim of the commissioners to put the Doherty interests out of business. They intend to buy only a small portion of present lines by condemnation and throw out the rest. The bus feature also tends to provide competition. The voters will be asked to hand over to the Council $7,000,000 to provide a transportation system.

Litigation Predicted

The generality of the ordinances and the piecemeal plan of condemnation of lines have led to predictions on the part of many of the leaders in both sides of the fight that the question will finally end in a multiplicity of litigations. There is not much doubt about the passage of the ordinances. The abstract question of municipal ownership of the railway passed before by a large majority and political sentiment has been increasing toward the public ownership view.

Duluth Abandons Wage Raise

Defeat of the 6-cent fare ordinance at the recent city election has obliged the Duluth (Minn.) Street Railway to abandon its plans to grant employees an increase of 10 per cent in their wages. Herbert Warren, vice-president and general manager of the company, has so informed the committee representing the Employees' Athletic & Protective Association, which demanded a 20 per cent increase.

The committee called attention to the fact that the wages of employees of the company were lower than those of men in other occupations in the city and in some instances lower than men in electric railway work were paid in other cities. Since the defeat of the 5-cent fare, many of the men have said they will have to seek other and more remunerative employment.

Mr. Warren stated that the company had fully expected to share with its employees any increase in revenue received as a result of the increase in fare. He stated that the officers of the company had gone so far as to agree, some days prior to the election, upon a definite plan of increase in wages to be announced in a bulletin and to become effective on July 1, in the event of the passage of the ordinance.

Twenty Per Cent Advance

Arbitrators at Scranton Award Trainmen Sixty-Cent Maximum Wage Scale

Under the award of the majority of the arbitrators chosen to pass on the wages and other working conditions of the employees of the Scranton (Pa.) Railway the maximum scale of pay for trainmen is fixed at 60 cents an hour. This is an increase of 20 per cent. Since the majority of the motormen and conductors have been in the company's service sufficiently long to come within the provisions of the maximum hourly scale, most of these men will get 60 cents an hour. The mechanical workers have been awarded a 12 per cent advance.

Points at Issue Stated

The questions at issue before the board as explained in the award were:

1. What rate of wages should be awarded to motormen and conductors
2. Whether or not time and one-half should be paid for all time worked on the following days: Decoration Day, Independence Day, Labor Day, Christmas Day and Sundays.
3. Whether or not eight hours should constitute a day's work for all motormen and conductors.
4. Whether or not any change should be made in the classification of employees in the shops of the company.
5. What rate of wages should be awarded to barnmen, shopmen, power house men, trackmen, and any other miscellaneous employees who are members of the association.
6. Whether or not the employees should be paid once a week, instead of semi-monthly as at present.
7. Whether or not eight hours should constitute a day's work on all work done in the track department.
8. What overtime rate should be paid to barnmen, shopmen, power house men, trackmen, and any other miscellaneous employees who are members of the association.

The wage award of the board follows:

To motormen and conductors for the first three months of service, 50 cents an hour; for the next nine months of service, 55 cents an hour; after one year, 60 cents an hour.

To all other employees, who are members of Division 168, Amalgamated Association, 12 per cent increase over their present wages, whether paid by the hour, day, week or month.

Back pay of each class of employees shall be allowed on the basis of the wages awarded above from April 1, 1920, and on the basis of the actual earnings of the employees.

The company shall be allowed ninety days from the date hereof for the payment of the back pay.

In case of any disagreement as to the construction or application of this award the same shall be submitted to William J. Tracey, chairman of this board, and both parties shall be bound to carry out his decision.

Relative to the demands other than that for increased wages the majority of the board states in part:

We have not awarded the eight-hour day here, although we believe in it in principle, because it does not seem, under the peculiar conditions existing here, that an eight-hour day could be awarded at the present time.

In awarding the employees a substantial increase in wages we have not seen fit to place any other additional burdens upon the company.

Classifications Unchanged

We have not changed the classification of the barnmen, shopmen, power house men and trackmen, because there was not enough evidence before this board to enable us intelligently to do that. But, in view of the conflicting claims of the employees and the company with respect to these classifications, we earnestly recommend that they should themselves attempt to solve this question.

We are not attempting in this award to pass upon the merits of any controversy between the company and anybody else except its employees, who are parties to the agreement for arbitration. But there has been a general tendency throughout the country in the last two years to recognize the fact that these companies must be helped and not hindered in their work, and we have before us evidence in many cities of the help of municipalities and states to street railway companies.

In its award the arbitrators deal at length with the claim of the men for increased wages so that they may be able better to make a winning fight against the high cost of living.

Akron Men Quit

The employees of the city lines of the Northern Ohio Traction & Light Company at Akron, Ohio, walked out on the morning of July 6. Interurban cars continued to operate, but they passed through the streets of the city with doors closed.

A board of arbitration recently granted the men an increase in wages on condition that the city make the rate of fare sufficiently large to cover the additional expense. The men at once urged that steps be taken to make it possible for them to receive the increased wage.

A compromise offer was made by the city and considered at a conference between officials of the company and the public utilities committee of the Council on July 3, but nothing was accomplished at that time.

Akron has had plenty of time to consider an increased rate of fare. The company asked and was granted a rate of 6 cents two years ago by the City Council, but the legislation was defeated in a referendum vote. Since then the company has been endeavoring to secure a rate that will enable it to pay its men higher wages.

Two months ago the men asked for an increase in wages. The company refused on the ground that its income was not sufficient to pay higher wages. Finally the company and the men agreed to submit the matter to arbitration. The three men selected to render a decision fixed a material increase in wages, but said that their award could not go into effect until the city had granted a higher rate of fare.

The Council of Akron adopted a resolution on the evening of July 7 giving the company thirty-six hours to put cars into operation. Court action was threatened in case of failure to resume service. Manager Blinn said the company was trying to induce the men to resume work at the present scale pending the granting of a new rate of fare by the city. The city offered a sliding rate of fare beginning with 5 cents for the first six months and increasing 1 cent each six months until the revenue was sufficient to pay expenses. The company said a ticket fare of 7 cents or a cash fare of 8 cents was necessary at once.

At Massillon forty men struck when the City Council on July 3 informed the company that it would not grant a 10-cent fare. The fare situation at Canton is referred to elsewhere in this issue.

Long Fight in Rochester

Service-at-Cost Arrangement Likely to End Controversy in Which Public Has Suffered

The service-at-cost franchise presented to the Council of Rochester, N. Y., on June 30 is the culmination of a long controversy between the city and the New York State Railways over the existing 5-cent fare. For several years the railway sought to have the rate of fare raised, so as to meet a proportionate increase in the cost of maintenance. The city opposed the move.

Public Opinion Aroused

The railway claimed that it could not provide good service at a 5-cent fare. The city's demands for better service continued. Meanwhile public opinion became aroused and the newspapers launched into a fight for better service. One newspaper intimated that the city was seeking better service regardless of whether it would entail expense by the railway which could not be met. A demand was made that the Mayor act at once.

The case was taken before the Public Service Commission and the city presented a plea to compel the company to improve service. In its decision handed down in April, 1920, the Public Service Commission rejected the demands of the city and declared that the railway could not provide better service with a 5-cent fare. It was suggested that a temporary agreement be drawn up, pending the determination of a fair rate for the railway.

On April 27 Mayor Edgerton recommended that the Common Council enter into a new agreement with the New York State Railways for a service-at-cost plan. The Council was requested to make an investigation at once, and if it deemed such an agreement advisable, to direct the preparation and execution of a service-at-cost contract. This it subsequently did.

Fare Case Complicates Matters

Meanwhile another controversy between the city and the railway was being waged in the Supreme Court. For years the rate of fare from Rochester to Charlotte, which up to 1918 was a town about 3 miles from Rochester, was 10 cents. When Charlotte was annexed to the city, officials declared that the original franchise provided that the fare should be reduced to 5 cents, as Charlotte had become a part of Rochester. This the railway refused to do, however, and the case was taken to the Supreme Court. Thousands of rebate slips were issued to patrons over the Charlotte line, in the event of a decision against the company.

Now that the service-at-cost plan has been drawn up, however, the fight has been dropped, as a decision that the rate of fare should be 5 cents, would mean that the city would have to take the money out of its own treasury to pay the railway patrons. The new franchise will provide for an initial fare of 7 cents in Rochester and to Charlotte.

Philadelphia Hearing Begun

Public Service Commission, Sitting in Philadelphia, Hears Transfer-Charge Plea

Six of the seven members of the Public Service Commission of Pennsylvania sat in judgment on July 6 on the tariff filed by the Philadelphia Rapid Transit Company calling for a universal 3-cent transfer charge. The principal witness was W. C. Dunbar, financial vice-president of the company. He told the commissioners that the change was merely an experiment. He estimated the company was faced with a deficit of $1,904,058 in the event that the fare was not raised. The officers felt it advisable to ask for a higher fare at this time. R. H. Horton, traffic engineer, believed the schedule which the company had filed was the best means of getting increased fares. The transfer passengers cost more to carry than any others and it was a matter of justice that they should pay the increased fare.

PRESIDENT MITTEN TESTIFIES

President Mitten was the witness on July 7. He said that if Philadelphia expected to have high-speed lines the city would have to pay a rate of fare considerably higher than the present figure. He said that a high-fare policy would have to be instituted in Philadelphia if the deficit that has accumulated continued to pile up while the commission made an extended study of the local situation. The company had resorted to every known method of increasing revenue and decreasing costs. There had always been complaint because of the discrimination of the transfer system. The Stotesbury-Mitten management, if it meant anything, functioned first for the interest of the public it served, then for the men it employed, and lastly for the stockholders of the company.

The free transfer system was uneconomical and wrong in that it was a part of human nature to be wasteful of that which was free. One of the greatest troubles in Philadelphia has been the lack of continuity in carrying negotiations between the company and the city to a proper conclusion. Every time a new city administration comes into power, the company is required to start over.

Fail to Agree on Umpire

Employees of the International Railway, Buffalo, N. Y., are greatly disappointed as the result of the failure of the arbitrator named by the Buffalo local of the Amalgamated and the company's representative to agree on an umpire for the board which proposed to settle the wage question and other grievances between the International and its employees.

The company's arbitrator is C. J. Joyce, Philadelphia, representing the Mitten interests. The employees' representative is James H. Vahey, counsel for the Amalgamated. Charles B. Hill, chairman of the Public Service Commission for the Second District proposed by the railway as the umpire, has refused to serve. No other names have been suggested.

When the arbitration was agreed upon three months ago the platform men and other employees were given to understand that whatever wage award should be made would be retroactive to May 1. Platform men now are receiving 60 cents an hour. They ask 88 cents an hour. The company also insists upon an open shop. While not demanding a closed shop contract, the men ask a renewal of their agreement as in the past.

Mediation in Twin Cities

Trainmen There Prepare for Arbitration of Wage Demands—Had Threatened Strike

Through the mediation of business men the threatened strike of trainmen of the Twin City Rapid Transit Company in Minneapolis, St. Paul and suburbs set for July 1 was obviated. The men in both cities voted agreement to the plan and have appointed their representatives on the boards of the two cities. These boards will consist of four members for the company, four for the trainmen, four for the citizens and the Mayor.

The men demanded 70 cents an hour maximum, and eight-hour day and time and a half for sundays, overtime and holidays. The company announced it could not grant these demands without a 7-cent fare in both cities. A strike vote had been taken when a plan of arbitration was formed and presented to the men. The matter is now up to the arbitration board. This body has begun hearings as to the justification of the demands. Each city will name experts to go over the company's books to determine whether the fare advance is justified in each city.

The citizens' arbitration plan adopted by the trainmen reads:

1. That the committee is unanimous in its opinion that the employees of the railway are entitled to an increase in wages; that the railway is entitled to an increase in fare, and that this desirable result can best be obtained by means of an agreement between the three parties interested—namely, the people of Minneapolis, as represented by the City Council, the owners of the railway and the employees of that company.

2. As a means to that end, it is concluded that this may best be done by the creation of a board of investigation and arbitration to consider as fully as may be necessary the claims made by the railway for an increase in fare and by its employees for increased wages and better working conditions, and the extent to which those claims are consistent with the public interest.

3. It is the belief of the Mayor's committee that this board may properly be selected in the following manner:

The railway employees to select four men. The railway to select four men and five citizens not financially interested in the railway, of whom Mayor J. E. Meyers shall be one to be selected by the Mayor's committee and that this board as selected shall act as speedily and as efficiently as possible to determine all matters in controversy.

The management of the railway has agreed in case such board is constituted to accept and abide by its decision and the acceptance of this plan by the employees must of necessity commit them also to the acceptance of its conclusions.

The management of the railway has further agreed that the rate of wages which is determined by this board shall be made retroactive for a period not exceeding thirty days prior to the date when an ordinance or resolution of the City Council granting the necessary increased fare becomes effective; in any event not prior to July 1, 1920.

Provided, this plan is accepted by the employees of the railway, the Mayor's committee of citizens pledges its best efforts to obtain a speedy settlement of this matter by the City Council.

Under instruction of the arbitration board an analysis is under way of the financial statement which has been submitted by the Minneapolis Street Railway. The work is being done by H. B. Warren, head of the bookkeeping department of the Cream of Wheat Company, released temporarily for the purpose. Milo Roy Maltbie, New York, consulting engineer, is expected to arrive on July 15 to go over Mr. Warren's findings. Mr. Maltbie has represented the city before. In St. Paul the arbitration board has been appointed. It is a representative body drawn from all walks of business life.

Tacoma Fare Negotiations Fail

Negotiations between the city of Tacoma and the Tacoma Railway & Power Company have been broken off, following a failure to reach an agreement. In a report to the Council City Attorney Harmon declares the company desires a fare that will return from 4 to 8 per cent on its valuation of $6,000,000. He declares the valuation is excessive, and that it would avail nothing to continue the negotiations for a new franchise.

The City Council has gone on record, in line with suggestions of Mr. Harmon, that an increase in the present 7-cent fare should not be permitted, and that profits for the company should not be guaranteed. Some members of the City Commission believe that a 10-cent fare is inevitable. Mayor C. M. Riddell and other members of the Council believe a 10-cent fare will result in a loss to the company and will encourage jitneys in the city.

Aldermen Defeat City Ownership

The Board of Aldermen of New York voted no on President F. H. La Guardia's proposal to appropriate $300,000 in special revenue bonds for the purchase of trolley cars by the city to be operated by the city over tracks of the Midland Railway on Staten Island. The resolution was lost by a vote of fifty-one for and fourteen against, fifty-five votes being required for approval of the bonds. The fourteen adverse votes were registered solely on the ground of opposition to the principle of municipal ownership of railways.

Mr. La Guardia in support of his resolution said:

The plea that the city does not want to go into municipal ownership is about fifteen years behind time. The city already owns millions of dollars worth of subways. The present question is not one of municipal ownership of the traction lines, but of the traction companies owning the municipality. Of course the traction interests are fighting it. Their plan is first to get the buses off the streets and then shut down certain of the larger feeder lines in order to force an increased fare.

Dayton Strike Settled

The strike of the trainmen on the railways at Dayton, Ohio, has been settled. The men will receive 58, 60 and 62 cents for three, six and twelve months' service respectively. The companies have been granted a 7-cent fare with eight tickets for 50 cents. The strike has been long drawn out. At one stage the City Commissioners authorized a rate of fare of 7 cents, but afterward this was withdrawn.

Along about July 1 the situation assumed a serious aspect. The city commissioners ordered operation to be resumed at once. The companies on July 1 demanded police protection for the cars. Later the companies tried to swear in a sufficient number of special policemen to protect their property.

The companies conceded that the demands of the men were in a large measure just and expressed their willingness to treat with the men on condition that the city fix a new rate of fare that would cover the additional expense involved in any wage advance.

News Notes

Wages Being Negotiated at Albany.—A new wage contract retroactive to July 1 is being negotiated between the United Traction Company, Albany, N. Y., and the local division of the Amalgamated Association.

Scholarships for Sons of Employees.—Henry L. Doherty and Frank Frueauff of the Cities Service Company, New York, N. Y., have offered to assist the sons of Doherty employees to secure technical training by creating scholarships in some of the leading technical schools and universities in the country. Employees receiving $200 a month or less who desire to give their sons such a training may avail themselves of this most generous opportunity.

Eastern Massachusetts Wage Hearing Begun.—The wage hearing in the case of the Eastern Massachusetts Street Railway was begun at the State House, Boston, Mass., on June 29. The present maximum rate is 51 cents an hour and the schedule of wage demands presented calls for a maximum of 75 cents an hour, one day off in fifteen with pay and overtime pay at the rate of time and one-half for all work performed on Sundays and holidays, effective May 1, 1920.

Wage Advance for West Penn Men.—The West Penn Railways has announced to its employees at McKeesport that it will increase wages of carmen in keeping with the schedule adopted recently for the trainmen of the Pittsburgh Railways, the maximum being 70 cents an hour. Several thousand employees of the company in McKeesport, Irwin, Greensburg, Connellsville and Uniontown are affected by the wage increase, which becomes effective at once.

Plan to Rent Elevated from City.—T. E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, has replied to Mayor Moore, saying he will recommend to the board of directors, and through them to the stockholders, that the Philadelphia Rapid Transit enter into a lease with the city, for a term of years to be agreed upon, to operate the Frankford "L" as a part of its street railway system, paying annually to the city of Philadelphia as rental a sum equivalent to 5 per cent of the entire investment of the city therein.

Presentation to Chairman Walker.—In recognition of the work done by A. F. Walker as chairman of the committee of the New England Street Railway Club in charge of the outing to Montreal the members of the club presented to him while in that city a gold watch chain and pendant. The presentation was made at a luncheon on June 30 given to Col. J. E. Hutcheson at the Ritz-Carlton Hotel by the members of the club, in recognition of the many courtesies extended by Colonel Hutcheson and his staff to the members of the club while on their trip.

Charter Change Provides for Municipal Ownership.—Wider control over public utilities with the power to purchase, hire, construct, own, maintain and operate or lease them, as well as to prescribe the form of and audit the accounts and records of such utilities, is given the city of Atlanta in the proposed new charter which will be considered by the State Legislature now in session. The charter will make many changes in the present form of Atlanta's city government. If passed by the State Legislature, the measure will be voted upon at the polls some time in July.

Advisory Members for Power Survey.—The American Electric Railway Association and the National Electric Light Association have been requested by the Secretary of the Interior to designate representatives on the advisory board which is being formed in connection with a governmental survey of the power resources of the north Atlantic seaboard. This advisory board will work in close co-operation with the engineering staff which is headed by William S. Murray. The survey was authorized at the last session of Congress. It is being conducted under the direction of the U. S. Geological Survey.

Seek Release from Wage Contract.—C. G. Bookman and the executive committee of the union waited on Thomas S. Wheelwright, president of the Virginia Railway & Power Company, Richmond, Va., recently to ask release from the yearly wage contract with the company. Mr. Wheelwright refused to grant the request of the men. It was learned after the conference that members of the union held a meeting not long ago and voted to abrogate their contract and give the company sixty days' notice to increase their wages, or strike. Through the action of President Bookman, the executive committee and the older men in the union, another meeting was called and the vote reconsidered.

Court Overrules Track Relocation Decree.—The Supreme Court of Errors of Connecticut has found an error in an opinion of Judge Webb of the Superior Court of Fairfield County, which affirmed an order of the Public Utilities Commission directing the Connecticut Company to relocate its tracks in Hope Street, Stamford. The Supreme Court directs the Superior Court to reverse its judgment, thereby sustaining the appeal of the Connecticut Company. The court says that from the standpoint of public interest and expense involved the Connecticut Company should not be required to relocate its tracks, the cost of which would be $28,000. The Public Utilities Commission order was made upon appeal of the Selectmen of Stamford.

Pittsburgh Men Sign Wage Agreement.—Representatives of the motormen and conductors of the Pittsburgh (Pa.) Railways have formally ratified the agreement recently reached by which the men are to receive a maximum rate of 70 cents an hour for a year. The trainmen demanded a maximum hourly wage of 91 cents an hour. This the receivers explained they were unable to pay on account of the financial status of the company. A strike was narrowly averted by the arrival in Pittsburgh of W. J. Fitzgerald, international vice-president of the Amalgamated Association, who ordered the trainmen to do one of three things: Consider a just compromise, submit to arbitration or forfeit their charter in the international organization. An agreement on a 70-cent-an-hour basis followed.

Six Dollars a Day for Line Car Men.—The utilities committee of the City Council of Seattle, Wash., has recommended that a daily wage of $6 be approved for line car operators of the municipal railway. D. W. Henderson, general superintendent, states that this wage has been paid to line car men up to this time, but the Civil Service Commission recently informed him it was in violation of the city ordinance fixing the rate of pay for motormen at $5 a day. Agreement had been made, according to Mr. Henderson, by former Superintendent Thomas F. Murphine to pay these men the $6 wage, and after looking into the matter, the civil service commission declared this to be a proper remuneration considering the type of work these employees perform. They operate service cars in the repair of tracks and of cars when the latter are out of commission.

Financial and Corporate

Foreclosure Suit Started

Hearing of Bill to Dispose of Some of Underlying Properties of Pittsburgh Railways

The hearing on the bill to foreclose the mortgage of the Southern Traction Company, a unit of the Pittsburgh (Pa.) Railways, and on the answer thereto of Receivers Charles A. Fagan, S. L. Tone and W. D. George was begun recently in the federal court of the district of Western Pennsylvania, at Pittsburgh, before Judge Charles P. Orr.

Just what portion of the holdings of the Southern Traction Company is covered by the mortgage will be determined by the court when all the evidence is in, so that the property affected by the decree of sale, which is expected to be handed down later, can be enumerated.

About one year ago, after the bondholders of the mortgage of the Southern Traction Company began proceedings to foreclose because of the failure of the parent concern to pay the interest as it fell due, the receivers opposed the suit. Their opposition was based upon the legality of one unit of the railway system foreclosing on a mortgage in face of the danger of disrupting the unified system.

Arguments and claims of the receivers were set forth in an answer to the bill. Judge Orr, before whom the proceedings were held at that time, handed down an opinion declaring it proper for the bondholders to bring such action as a unit of the system. This opinion was subsequently upheld by the federal Circuit Court of Appeals for the Third District.

The court is expected to determine what will be embodied in the decree of sale, and also will probably determine the lowest, or "upset," price which will be accepted.

Interurban Would Abandon City Lines

The Toledo, Bowling Green & Southern Traction Company, has asked the City Council of Findlay, Ohio, for permission to abandon its lines operated in that city. The Council has referred the request to its committee on railways. Charles F. Smith, general manager of the company, said:

> Our loss was $2,830 in 1917 from the city railway, $9,182 in 1918, and $14,068 in 1919. This does not include bond interest or taxes, which items in 1919 amounted to $19,166, making a total loss of $33,235 for 1919. Future losses will be greater.

Mr. Smith explained that the city was now enjoying the lowest fares of any city he knows. The company averages 4¼ cents from each passenger carried due to the sale of tickets at six for 25 cents and twenty-five for $1. He explained that a higher fare would have reduced the business to such an extent that there would have been no economy in it. He said the directors of the company wished to take similar action a year ago, but declared he had persuaded them to forestall such action.

Dallas Carries More Passengers

Approximately 150,000 more persons were transported by the Dallas (Tex.) Railway during May than were carried during April. A total of 5,681,000 passengers was carried during May, of which number 13 per cent were transfer passengers.

The gross income of the company for May amounted to $261,300 and total expenditures $225,502, leaving net revenue for the month of $35,798. This is at the rate of 4.85 per cent on the valuation of the company's properties.

Of the total amount of expenditures, $60,354.38 went for maintenance.

Cars in Dallas traveled a total of 626,812 car miles during the month, maintaining an average speed of 9.1 m.p.h. An average of nine persons per car mile was transported.

Operating Ratio 84.8 Per Cent

Only One Operating Company in Connecticut Paid a Dividend — 225,000,000 Passengers Carried

The eighth annual report of the Conneticut Public Utilities Commission for the fiscal year ended Sept. 30, 1919, has recently been issued. This report also contains financial reports of all public service companies for the calendar year 1918 as well as statistical tables relating thereto.

Abstracts are herewith given covering such information as pertains to electric railway operations within the State.

There are nineteen electric railway companies reporting to the commission, fifteen of which are in operation. In reality there are only twelve operating companies as three of those in operation are leased.

The results of electric railway operations, excluding all figures relating to the Rhode Island company, which runs the great bulk of its lines in Rhode Island, show a net revenue from operations of $724,138 less than such revenue the year previous. Operating revenues decreased $94 308, while operating expense increased $629,830. The decrease in operating revenue was practically all in passenger revenue,

SUMMARY OF CONNECTICUT OPERATIONS

	1918	1917	Percentage Change
Number of companies reporting	21	19	10.52
Number of operating companies	12	9	25.00
Assets:			
Investment in road and equipment	$98,099,999	$97,473,668	6.43
Other investments	3,035,456	2,785,034	8.97
Current assets	3.399,994	2,290,759	48.50
Deferred assets	59,638	77,441	—23.00
Unadjusted debits	1,620,825	1,581,366	2.49
Total assets	$106,215,912	$104,208,268	1.93
Liabilities:			
Capital stock	$61,774'440	$61,774,400	.....
Long term debt	27,158,032	27,193,408	—0.13
Current liabilities	6,500,014	4,019,914	61.80
Deferred liabilities	21,894	20,283	7.95
Unadjusted credits	7,398,334	7,339,539	0.80
Appropriated surplus	1,218,754	1,092,695	11.52
Profit and loss	2,144,484	2,768,029	—22.50
Total liabilities	$106,215,912	$104,208,268	1.92
Operating revenues:			
Revenue from transportation	$12,259,622	$12,341,064	— 0.7
Other railway operations	174,448	187,314	— 6.9
Total operating revenue	$12,434,070	$12,528,378	— 0.8
Operating expenses:			
Way and structures	$1,442,847	$1,677,925	—14.0
Equipment	1,306,353	983,875	32.8
Power	2,514,660	2,529,114	— 0.6
Conducting transportation	3,988,526	3,458,965	15.3
Traffic (Credit)	2,189	3,960	44.8
General and miscellaneous	1,296,121	1,270,569	2.0
Total operating expenses	$10,546,318	$9,916,488	6.4
Net revenue railway operations	1,887,752	2,611,890	—27.8
Net revenue auxiliary operations	107,790	98,294	9.7
Net operating revenue	$1,995,542	2,710,184	—26.4
Taxes assignable to railway operations	660,952	682,995	— 3.2
Operating income	$1,334,590	$2,027,189	—33.8
Non-operating income	1,722,609	1,684,025	2.3
Gross income	$3,057,199	3,711,214	—17.7
Deductions from gross income:			
Rent for leased roads	$1,340,359	$1,339,208	0.09
Miscellaneous rents	7,847	7,978	— 1.6
Miscellaneous taxes	100	289	—65.5
Interest on funded debt	1,055,172	1,054,423	0.07
Interest on unfunded debt	154,577	57,638	168.2
Amortization of discount on funded debt	1,905	1,920	— 0.8
Income transferred to other companies	6,645	10,939	—39.4
Maintenance of organization—lessor companies	4,746	5,368	—11.6
Miscellaneous deductions	4,981	24,726	—80.0
Total deductions from gross income	$2,576,332	$2,502,489	3.0
Net income transferred to profit and loss	$480,867	$1,208,725	—60.3

other decreases amounting to a little more than $2,000.

The greatest increase in cost in operations was for conducting transportation. The amount charged for salaries and wages was $616,384 more than in 1917, and this amount is practically the net increased cost of operating expenses, although there was an increase in cost of maintenance of equipment of $322,478. This increase in the cost of maintenance of equipment was offset by the decreased amount expended in maintenance of way and structures.

The total operating revenue was $12,434,070, while the operating expenses were $10,546,318, leaving a net revenue from railway operations of $1,887,752.

The net revenue from auxiliary operations of $107,790 is the result of the general electric operations carried on by the Shore Line Electric Railway, the Bristol & Plainville Tramway and such operations in addition to conducting miscellaneous park and amusement places by the Danbury & Bethel Street Railway.

PROFIT AND LOSS ACCOUNT—CONNECTICUT COMPANIES

	1918	1917	Percentage Change
Credits:			
Balance at beginning of year	$2,768,029	$2,769,374	— 0.05
Balance transferred from income account	480,867	1,208,725	—60.3
Miscellaneous credits	29,140	27,701	5.2
Total credits	$3,278,036	$4,005,800	—18.2
Debits:			
Dividend appropriations	833,909	805,373	3.5
Miscellaneous debits	299,643	432,398	—30.8
Total debits	$1,133,552	$1,237,771	— 8.3
Balance at close of year	$2,144,484	$2,768,029	—22.6

STATISTICAL INFORMATION—CONNECTICUT COMPANIES

	1918	1917	Percentage Change
Passenger car-mileage	34,049,713	37,167,625	— 8.3
Freight, mail and express car-mileage	854,844	977,450	—12.6
Total revenue car-miles	34,904,557	38,145,075	— 8 5
Passenger car-hours	3,642,845	4,017,360	— 9.2
Freight, mail and express car-hours	128,806	90,753	41.8
Total revenue car-hours	3,771,651	4,108,113	— 8.2
Ratio CM to CH (passenger cars)	9.34	9.26	0.06
Passenger traffic:			
Regular fare passengers	188,162,078	215,822,889	—12.7
Free transfer passengers	35,263,246	40,724,467	—13.5
Other free passengers	1,952,560	3,033,998	—35.6
Total passengers carried	225,377,884	259,581,354	—13.2
Passenger revenue	$11,501,927	$11,593,981	— 0.8
Average fare per revenue passenger (cents)	6.12	5.47	11.8
Operating ratio (per cent)	84.8	79 1	8.5
Car-mile statistics:			
Operating revenue (cents)	35.68	32.90	8.2
Operating expenses (cents)	30.2	25.98	16.2
Net income (cents)	1.37	3.16	—56.6
Passenger traffic (total)	6.62	6.99	— 4.2
Car-miles per ravenue passenger	0 181	0.126	43.6
Car-hour statistics:			
Operating revenue	$3.30	$3.06	7.9
Operating expenses	$2.80	$2.41	16.2
Net income	$0.127	$0.294	—56.8
Passenger traffic (total)	62 0	53.7	15.2
Taxes—per cent of gross revenue	5 31	5.46	— 2.7
Per cent of net operating revenue	33 08	25.20	31.3
Return earned on stock outstanding	0.78	1.96	—60.2
Mileage statistics:			
Miles of road	861.477	861.345	(d)
Miles of second main tracks	218.283	217.038	(d)
Miles of sidings and turnouts	42.305	42.538	(d)
Miles of tracks in car houses, shops, etc	3.753	3.753	.....
Total track mileage	1,125.818	1,124.674	(d)
Rolling stock owned:			
Closed passenger cars	998	1040	— 4.0
Open passenger cars	782	865	— 9.5
Combination closed and open passenger cars	42	42	.....
Total passenger cars	(a) 1822	(c) 1947	— 6.3
Freight cars	52	79	—34.2
Express cars	34	32	6.2
Combination cars	9	5	80.0
Work cars	132	110	20.0
Snow plows	91	96	— 5 2
Snow sweepers	26	26	.....
Miscellaneous	74	97	—23.7
Electric locomotives	2	2	.....
Total equipment—all classes	(b) 2242	(c) 2393	— 6.1
Employment statistics:			
Aggregate salaries and wages paid	$6,065,031	$5,448,647	11.4
Number of general officers	41	48	—10.4
Number of general office clerks	373	304	22.8
Number of employees maintenance of way and structures	783	823	— 4.8
Number of employees maintenance of equipment	466	434	7.4
Number of employees power departments	345	434	—20.5
Number of employees transportation department	3549	3782	— 6.3
Total—all employees	5557	5825	— 4.6
Average yearly wage paid per employee	$1092	$935	16.9

(a) Includes 7 cars without electrical equipment.
(b) Includes 85 cars without electrical equipment.
(c) Includes 125 cars without electrical equipment.
(d) Less than one-tenth per cent change.

The amount paid in dividends for all companies was $833,909, an increase of $28,536 over the previous year. Only one operating company, the Bristol & Plainville Tramway, paid dividends during the year. All other dividends paid were by lessor companies.

Power Companies Absorbed

Bird and Chisholm Holdings Taken Over By Central Maine Power Company —Planning for Future

Acquisition of a majority of the stock issues of the public utilities controlled by Maynard S. Bird, Portland, Me., and Hugh J. Chisholm, New York, by the Central Maine Power Company has recently been announced by the Public Utilities Commission of Maine.

Three Companies Included

The companies involved include the Oxford Electric Company, furnishing light and power in Norway and South Paris, and Androscoggin Electric Company operating the electric railway between Augusta and Lewiston and the light and power company serving Rockland, Thomaston and nearby towns. They have deposited their certificates of stock, for which they have received in exchange share for share in the Central Maine Power Company.

There was no opposition when the plan was presented to the Public Utilities Commission. A petition for authority to increase the stock of the Central Maine Power Company was included in the petition to the commission and was granted.

The only change that will be made in the Androscoggin Electric Company is that it will be called the Androscoggin Corporation and the management and treasureship will be handled at Augusta. The Central Maine Power Company has recently harnessed the Kennebec River at Skowhegan. By this latest crusade, the company will more than double its water developed horsepower and reduce its operating expenses of steam power plants by some $92,000 a year in addition to furnishing more power to Maine industries ready to buy it and new industries to come.

Realizing a Vision

The Central Maine's Skowhegan development will ultimately produce more than 20,000 h.p., one of the biggest power developments in the State. The work now being done is costing about $800,000 and will be financed by the sale of the company's 7 per cent preferred stock. This is being offered at the present time at $107.50 a share.

The coal shortage has assumed serious proportions and has driven many industries to look forward to the day when they must either move their plants to points where they can get hydro-electric power or go out of business. The vision of those pioneers in Maine history who could see the rushing of the water transformed into heat, light and power is coming true. The first big steps are being made by the Central Maine Power Company.

$1,907,766 Shore Line Value

The appraisal of the property of the Shore Line Electric Railway, Norwich, Conn., was filed in the office of the Superior Court in Norwich recently. It shows a total valuation of $1,907,766. Most of the company's lines are appraised on the scrap basis, but the Westerly-Groton line and Old Mystic line are figured on a reproduction basis.

The appraisers were William R. Dunham, Jr. and Shepherd B. Palmer. The appraisal was filed by Receiver Robert W. Perkins.

A summary of the appraisal of the various lines, cars and other properties follows:

New Haven to Guilford (scrap)	$73,444
Guilford to Stony Creek (scrap)	48,930
Guilford to Saybrook (scrap)	81,368
Saybrook to Chester (scrap)	152,705
Ferry Road Junction to Flanders (scrap)	65,248
Saybrook Power House (scrap)	47,787
Flanders Corner to Crescent Beach (scrap)	24,484
Flanders Corner to New London (scrap) $301,779	71,991
Norwich to Hallville (scrap) $214,854	41,700
Fort Point Branch (scrap) $20,463	3,807
Hallville to State Line (scrap)	104,662
Westerly to Groton (reproduction basis)	784,056
Old Mystic Line (reproduction basis)	78,867
Groton-Stonington cars	61,400
Other cars, not included above	147,600
Material and supplies, real estate etc.	119,717
Total	$1,907,766

Where properties were not being operated and where petitions for abandonment of service were before the court the appraisal was made at scrap value. Where these properties were still being operated, with reasonable expectation of operations being continued the properties were also appraised on the basis of reproduction cost less depreciation. It is the belief of the appraisers that where the two values are given the property may be made to realize a value somewhere between these two extremes.

Preferred Stock Offered Direct to Investors

Seven per cent cumulative preferred stock of the Alabama Power Company, Sheffield, Ala., is being offered direct to the public by the company. The proceeds are to be used for development and extensions. A statement by the company follows in part:

Terms of payment are as follows:

On cash basis: As many shares as are desired or the company may have to offer at $93 per share plus the accrued dividend to date of payment.

On partial payment: Any number of shares, up to twenty-five, paying $10 per share down and $5 per share each month until the purchase price is paid; to the final payment $3 is to be added to the accrued dividend from the last preceding dividend date.

This privilege is extended subscribers on the partial payment plan:

Should partial payment purchasers at any time or for any reason desire to withdraw before completing their purchase, money paid in can be withdrawn in full with interest at 6 per cent per annum upon ten days' notice to the company at any time prior to the date of final payment. On the other hand, purchasers may pay for their stock in full at any time and secure stock certificate.

Dividends are payable four times a year, Jan. 1, April 1, July 1 and Oct. 1.

The Alabama Power Company has been in successful operation for seven years. It serves directly an indirectly a population conservatively estimated at over 550,000, located in central and northern Alabama. The company is now extending its lines to Selma, and is furnishing power for one of the Montgomery utilities. Directly or indirectly the company does the electric light and power business in forty cities, and the railway business in three cities. It furnishes the power distributed throughout Greater Birmingham and Bessemer by the Birmingham Railway, Light & Power Company, and that distributed by the Montgomery Light & Water Power Company.

Security Values Shrink

Traction Bonds Have Declined More Than Any Other Class on New York Exchange

More traction securities are in default of interest now than at any other time in history. As a whole they show the largest decline of any class listed on the New York Stock Exchange. The *Wall Street Journal* says that default in nearly every case was due to the fact that the companies were unable to meet fixed charges because of the restricted 5-cent fare. Quite a number of these bonds are selling at prices that not only discount defaulted interest, but also a drastic reorganization. A compilation of traction bonds listed on the New York Stock Exchange showing high prices reached in 1917, high and low levels during 1920, and closing or last prices on June 21, 1920, with income return, is presented in the accompanying table.

Issue	1917 High	1920 High	1920 Low	1920 June 21	Yield
Brooklyn Rapid Transit 5s, '45	101⅛	33¾	21	21	†
Convertible 4s, 2002	77¼	28	21¼	23½	†
3-yr. 7% notes, '21	*97	50	38	41	†
Brooklyn City Railroad cons 5s, '41	101½	66	66	66	8.50
Brooklyn Union Elevated 5s, '50	101½	64	60	62	8.44
Broadway & Seventh Ave. 5s, '43	100	67½	40	40	12.13
Chicago Railways 1st 5s, '27	97½	70	57½	62	13.31
Columbus & Ninth Avenue 5s, '93	100	40	21	21	†
Connecticut Railway & Lighting Co. 4½s, '51	101⅛	60	60	60	8.03
Detroit United 4½s, '32	86½	69	60	60	10.22
Hudson & Manhattan ref. 5s, '57	69½	60	54	57	8.95
Adj. income 5s, '57	25½	23	13	19½	‡
Interborough-Metropolitan 4½s, '56	73½	19½	13½	15	†
Interborough Rapid Transit 5s, '66	99⅛	58	48	51½	9.63
Kings Co. Elev. 4s, '49	86½	60	50	53	8.19
Lexington Avenue & Pavonia 5s, '93	99½	42	40	40	†
Manhattan Ry 4s, '90	94	60	51	53	7.36
Milwaukee Electric Railway & Light 5s, '26	103	94½	92	92	6.64
Ref. and ext. 4½s, '31	93	77	77	77	7.63
Nassau Electric Railroad 4s, '51	74½	28	23	23	†
New York & Jersey 5s, '32	100½	78	73	78	7.87
New York Railways ref. 4s, '42	71⅛	32	20	22½	†
Adj. income 5s, '42	47⅛	7½	5	5	‡
New York State Railway 4½s, '62	87½	55	50	51½	8.76
Portland Railway 5s, '30	88½	64½	64½	64½	10.69
St. Paul City Railway 5s, '37	102½	80	80	80	7.04
Third Ave. ref. 4s, '60	80½	51½	40	41	9.35
Adj. income 5s, '60	73½	31	21½	23½	‡
Third Ave. Railway 5s, '37	108	84	75	75	7.66
Tri-City Railway & Light 5s, '23	101	92	87⅞	87⅞	9.76
United Railways Investment 5s, '26	70	75½	66	66½	13.09
United Railways St. Louis 4s, '34	61½	47½	47½	47½	10.55
United Railroad San Francisco 4s, '27	42	30	20½	23½	†
Virginia Railway & P ref. 5s, '34	93½	70	63	69	8.93

*Exchanged for 5% notes due July 1, 1918, at about 97.
†Interest in default.
‡Interest on these income bonds not earned or paid.

While no interest has been paid on United Railroads of San Francisco general first 4s, 1927, since Oct. 1, 1916, the company is not in the hands of a receiver. Interest has been earned on these bonds with the exception of one year, when a small deficit was reported. A protective committee for these bonds has agreed upon a plan of reorganization, which provides for taking care of all maturing obligations; paying off notes, and scaling down capitalization.

Direct Public Offering Successful

An extension of the tracks of the Springfield (Mass.) Street Railway in the eastern section of Springfield is assured by the successful campaign of citizens of that municipality to raise $300,000 for the purchase of street railway bonds. Clark V. Wood, president of the railway, announced on June 27 that more than two-thirds of the amount had been pledged. The work which the bond drive guarantees is to be started early in July. The proposed extension will provide two direct routes from East Springfield, which in the past six years has had a tremendous industrial expansion, to the center of the city.

The campaign for the sale of the bonds marks a new phase in the financing of electric railway extensions in the Connecticut Valley. The company very frankly stated earrly in the year that it could not provide the desired extension of the lines before 1921 unless the public furnished the money. The Springfield Chamber of Commerce co-operated in the campaign. The company has received permision from the Public Service Commission to issue $5,000,000 of bonds for rehabilitation of its property and payment of indebtedness.

Formal Notice of Foreclosure

The Farmers' Loan & Trust Company, New York, N. Y., has filed a formal notice of foreclosure in the United States District Court on the New York Railways 1912 issue of mortgage bonds, of which $30,616,000 is outstanding. It is explained that the notice is a legal formality to preserve the trust company's rights in the reseivership.

Financial News Notes

Suspension of Service Approved.—A petition of the Savannah (Ga.) Electric Company to abandon service on the Whitaker Street line in Savannah has been granted by the Railroad Commission.

City Selects Appraisers. — Harry Barker and George W. Fuller, New York, N. Y., have been named by the City Commission of Grand Rapids, Mich., to appraise the property of the Grand Rapids Railway for the city.

Operating Allowances Increased.—An increase of 5 cents per car mile in the operating allowance and 1 cent per car mile in the maintenance allowance of the Cleveland (Ohio) Railway has been approved by the City Council.

Replacement Issue Authorized.—The Arkansas Corporation Commission has authorized the Fort Smith Light & Traction Company, Fort Smith, Ark., to issue $200,000 of first mortgage bonds to replace a previous issue of second mortgage bonds.

Car Trust Certificates Sold.—A block of $875,000 car trust certificates of the United Railways & Electric Company, Baltimore, Md., was disposed of on June 30 by a syndicate which was headed by Alexander Brown & Sons and participated in by several other Baltimore bankers.

Towns Contribute to Support Road.—The towns of Norwood, Westwood and Walpole have jointly appropriated $6,500 to continue the operation of cars of Eastern Massachusetts Street Railway in those towns. The sum of $4,000 has been appropriated by the town of Braintree, on condition that a like amount be appropriated by the town of Randolph.

Plans To Resume Lockport Service.—The city of Lockport, N. Y., has accepted the tentative franchise offered by the International Railway for the resumption of traffic on the Grand and Gooding Street lines. The company abandoned the lines last summer rather than pay expenses of paving. The city dropped the paving plan and now will work with the railway to improve the street. The franchise is for ten years.

Interurban Reduces Dividends.—The directors of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., announced on June 23 that at a meeting on June 21 the preferred dividend was placed on a basis of 6 per cent and the common reduced from 13½ per cent, as of 1918, and the 7½ per cent, as of 1919, to 1 per cent quarterly. Since the war there has been a great loss in traffic on the line.

Surface Lines Protective Committee.—A protective committee composed of C. Robert Adams, Frank Coenan, G. E. Warren, vice-president of Columbia Trust Company; Frank D. Pavey, as counsel, Arthur N. Hazeltine as secretary and the Columbia Trust Company as depositary has been formed to represent the holders of first mortgage 5 per cent bonds of the Columbus & Ninth Avenue Railroad Company, New York, N. Y.

Discontinuance of Shuttle Authorized.—Job E. Hedges, receiver of the New York (N. Y.) Railways, has been authorized by Federal Judge Mayer to discontinue the shuttle car service from West 106th Street and Amsterdam Avenue to West 110th Street and Columbus Avenue and the operation of cars through West 145th Street to the Hudson River. The court also authorized Mr. Hedges to sell for scrap value 188 old electric cars not worth the expense of storing.

Court Authorizes Payment for Improvements.—The Toledo Railways & Light Company, Toledo, Ohio, was permitted to withdraw $35,770 from the Craig fund by Federal Judge John M. Killits to provide for the payment of a balance due on a large amount of repairs to tracks, lines and special work at carhouses this summer. The fund was started by the court to provide for improvements to service when fare increases were granted three years ago. Six per cent of the net receipts are placed in the fund by the company in weekly installments.

Boston Elevated Would Use Subway Fund.—The Department of Public Utilities of Massachusetts has approved the petition of the Boston Elevated Railway for permission to use a portion of the funds received from the Commonwealth through the purchase of the Cambridge subway. The elevated petitioned the commission for the use of $1,000,000 for the improvement of the Forest Hills station; $267,754 for the payment of floating debt incurred for improvements to the property, and $1,581,000 for the payment of bonds of the West End Street Railway.

Court Directs Loan Be Extended.—Judge Julius M. Mayer of the Federal District Court, on the petition of the Interborough Rapid Transit Company, New York, N. Y., has directed James I. Sheffield, receiver in bankruptcy for the Interborough Consolidated Corporation, to extend until Dec. 31 next the time for the payment of a loan made to the Interborough Rapid Transit Company. Several months ago when a receivership threatened the Interborough Rapid Transit Company the Interborough Consolidated loaned the company $1,000,000 until July 1. The loan was secured by notes.

$800,000 of Notes Offered.—Stone & Webster, Boston, Mass., and the Guaranty Trust Company, New York, N. Y., are offering for subscription at 96 and interest, to yield about 8 per cent, $800,000 of five-year 7 per cent gold notes of the El Paso (Tex.) Electric Company. The notes are to be direct obligations of the company and are to be secured by pledge of all the bonds, notes and stocks of the subsidiary operating companies now owned or hereafter acquired, which have an aggregate value in excess of $6,000,000, subject only to the lien of a closed $1,000,000 collateral trust bond issue maturing Jan. 1, 1932. Junior to the notes there are outstanding in the hands of the public $783,700 of 6 per cent preferred stock and $2,914,100 of common stock. Dividends on the common stock have been paid since 1910, and since Dec. 15, 1915, at the rate of 10 per cent per annum.

Notice of Failure to Pay Interest.—Homer Loring, chairman of the public trustees of the Eastern Massachusetts Street Railway, Boston, Mass., announced on June 30 to the holders of series A and series B refunding mortgage bonds of the company issued under indenture of mortgage dated Jan. 1, 1919, that the coupons due July 1, 1920, appertaining to the Eastern Massachusetts Street Railway refunding mortgage bonds of series A and of series B would not be paid at maturity. He promised that further announcement would be made as to the payment of the coupons or as to the issue of negotiable receipts in exchange therefor if the interest represented thereby is extended in accordance with the provisions of the indenture of mortgage. Lee, Higginson & Company, reorganization managers, explain that the above notice does not refer to the refunding mortgages one-ten year serial 6 per cent bonds, series SA, which are, in effect, guaranteed by the Commonwealth of Massachusetts, under the provisions of Chapter 188, special acts of 1918.

Preferred Stock Issue Contemplated.—A special meeting of the shareholders of the Winnipeg (Man.) Electric Railway has been called for July 27 for the purpose of ratifying and approving a by-law, amending the by-law authorizing the issue of $3,000,000 of 7 per cent cumulative preferred stock of the company, by providing for the payment of the dividend of 7 per cent per annum quarterly, instead of half-yearly, and for the purpose of sanctioning and confirming a by-law repealing the by-law authorizing the issue of paid-up common stock as a bonus in connection with the purpose of passing a resolution, authorizing the directors to sell and dispose of the preferred issue for such price and on such terms and conditions as they may think advisable. The president, Sir Augustus Nanton, in a letter to shareholders, regarding the new issue, states that the company's position has improved materially during the past eighteen months as a result of increased fares, other increased revenue and improved business conditions. The removal of the floating debt, he anticipates, will make surpluses available for extensions or dividends.

Traffic and Transportation

Commission Upheld

Pennsylvania Supreme Court Rules Commission's Rate-Making Power Is Absolute in Scranton Case

The Supreme Court of Pennsylvania on June 26, in deciding the case of Scranton vs. the Public Service Commission went on record as upholding the absolute authority of the commission to fix street railway fares regardless of contracts, franchises or ordinances.

The commission allowed the Scranton Railway a 7-cent fare or four tickets for 25 cents. The city of Scranton brought action against both the commission and the railway, claiming that the franchise of the company provided for a 5-cent fare and this provision could not be changed during the life of the franchise. The cases were appealed to the State Supreme Court. Chief Justice Brown rendered a decision in favor of the commission in the one case and dismissed the action against the railway.

DECISION FAR-REACHING IN EFFECT

The court decided that the rate-making power of the Public Service Commission was absolute; that it was part of the police power of the State and that no contract made between a municipality and a public utility fixing a rate was valid as the municipality has no jurisdiction and no legal right to assume a power delegated by the State to the Public Service Commission.

The effect of the decision will be far reaching. The ruling is said to have immediate bearing on the case of the city of Philadelphia and the Philadelphia Rapid Transit. Apparently the decision renders inoperative the clause in the 1907 contract between the city and the Rapid Transit Company fixing a 5-cent fare.

In rendering his decision Justice C. J. Brown states:

> The ninth section of the ordinance of the city of Scranton, giving its consent to the construction within its limits of the street passenger railway now owned and operated by the Scranton Railway, provides that a passenger "may ride from one part of the city to any other part of the city for a fare, which shall not exceed five cents." In pursuance of an order of the Public Service Commission, made April 22, 1919, the Scranton Railway filed a new schedule of rates, increasing its unit fare to 5 cents. An appeal from this order to the Superior Court was dismissed: City of Scranton vs. Public Service Commission 73 Sup. Ct. 192. On petition of the city of Scranton this appeal was allowed, limited however, to a consideration of the constitutional question of the power of the legislature to authorize the Scranton Railway to charge a fare in excess of that fixed in the consulting ordinance.
>
> The Legislature could not have authorized the construction of a street railway within the limits of the city of Scranton without its consent—for the consitution says—no street passenger railway shall be constructed within the limits of any city, borough or township without the consent of its local authorities.

Justice Brown then interprets this provision in terms of the decision in the case Allegheny City vs. Etna & Sharpsburg Street Railway, 159 Pa. 411, and states that this provision of the constitution must be read in connection with the third secion which says "the exercise of the police power of the State shall never be abridged or so construed as to permit corporations to conduct their business in such manner as to infringe the equal rights of individuals or the general well being of the state."

Justice Brown then continues:

> Street railways have become necessities. They exist everywhere and contribute in a very large measure to "the general well being of the State," as means of transportation and communication—though this is so, they cannot be operated in any municipality without its consent. With such consent they may be, and, as between the local authorities and the railway companies, there may be attached to it terms and conditions which must be performed by the companies, but a municipality may not annex such terms to its consent as will deprive the commonwealth of its inherent police power to see that a street passenger railway company is not prevented from serving the public by the municipality's enforcement of conditions in a consenting ordinance that have become impossible of performance. What may have been a reasonable rate of fare at the time of the passage of a consenting ordinance may, under changed economic conditions, become confiscatory, and a street passenger railway may not be able to serve the public on account of insufficient revenues, based upon the fare fixed in the ordinance. When such a situation arises, as it has arisen and will arise again, there must be relief somewhere to the public, and it lies in the police power of the state, which is never to be abridged or bartered away.

Tri-City Company Will Ask Increase

The Tri-City Railway, Davenport, Ia., already losing money on a 7-cent fare and a 60-cent scale, is arranging to take steps to increase its revenue to offset an increased labor charge of from $120,000 to $150,000 annually imposed under the arbitration award noted elsewhere in this issue.

A petition for an increased fare will be presented to the Public Utility Commission of Illinois at once. The petition will ask for either 8 or 9 cents, probably the latter.

In Iowa, where the cost of operation is higher than in Illinois, 9 or 10 cents will probably be necessary.

The situation in Iowa is complicated by an injunction secured by the retail merchants some time ago restraining the city from enforcing a 5-cent fare and providing for the collection of a 7-cent fare, the fare that has been in force for a year.

The situation there is also complicated by valuation and appraisal of the traction lines, a move instituted by the city at a probable cost of $25,000. This appraisal work is being done by Burns & McDonnell, engineers, of Kansas City. It will not be finished for 120 working days from June 28.

New York Cases Decided

Court of Appeals Has Defined Car Fare Increase Limitations—Rochester Case Cited

The Court of Appeals of New York in a decision handed down on July 7 declares that under certain franchise agreements the Public Service Commission for the First District may hear applications for increased fares separated as to lines of the Brooklyn Rapid Transit System, but has no jurisdiction to hear petitions for increased fares relating to the system as a whole.

The court also handed down a decision in the application of the city of Niagara Falls for a writ of prohibition against the up-State Public Service Commission and the International Railway, in which it held that where a street railway was operating under franchise granted prior to 1907, when the Public Service Commission was created, it could not charge a higher rate of fare than that specified in the franchise granted by the municipality.

The court holds, in the Brooklyn cases, that the following classes of franchises fall outside of the scope of the decision in the Niagara Falls case and the famed Quimby, or Rochester Railway case:

1. All franchises granted by the Legislature.
2. All franchises granted by municipal authorities prior to Jan. 1, 1875.
3. All franchises granted by municipal authorities subsequent to the passage of Public Service Commission law, July 1, 1907.
4. The following franchises were granted between Jan. 1, 1875, and July 1, 1907, the time when the Public Service Commission was created: (a) The franchise granted by the Brooklyn Common Council to Atlantic Avenue Railroad, March 13, 1882; (b) franchise granted by Common Council at Brooklyn to Prospect Park & Coney Island Railroad, Sept. 21, 1885; (c) franchise granted by Common Council, Brooklyn, to Nassau Electric Railroad, June 19, 1893, covering a number of lines.

The court says the affirmance is without prejudice to the right of the Brooklyn receiver to make separate application as to the franchises which thus come within the jurisdiction of the Public Service Commission.

In the three cases involving branches of the Brooklyn Rapid Transit System the Court of Appeals has affirmed the order of the Appellate Division which dismissed the writ obtained by Receiver Lindley M. Garrison to review the action of the Public Service Commission in refusing to permit an increase in fares to 8 cents on three subsidiaries, but without prejudice to the right of the receiver to make separate application as to franchises that come within the jurisdiction of the commission as indicated in the opinion of the court.

Corporation Counsel O'Brien of New York City has expressed the opinion that the franchises which fall outside the scope of the Rochester ruling are so few and so interwoven with franchises which are plainly controlled by the Rochester decision as to make it practically impossible to work out any increase in fares upon any of the systems of street railways within the city.

Five-Cent Fare Fast Disappearing

Association Figures Show That Only Sixty-six Out of 273 Cities Having 25,000 Population or More Retain Five-Cent Fare

Since the compilation made public by the information bureau of the American Electric Railway Association last February and up to June 1, 1920, fares in thirty-two additional cities of more than 25,000 population have been increased. Of these twelve were original increases, while the remainder were second and in a few instances third increases. Of the thirty-two new base cash rates thus established, two were 10 cents, four were 8 cents, seventeen were 7 cents, eight were 6 cents, and one was a 5-cent rate with an additional charge of 1 cent for a transfer.

THESE additional increases leave but sixty-six out of the 273 cities in the United States which according to the 1917 estimate of population had 25,000 or more inhabitants with a 5-cent car fare, and in forty-five of these an increase in fare is under consideration.

Only Sixty-six Five-Cent Cities

At this date car riders in 207 out of the 273 cities are paying more than a 5-cent base rate.

Car riders in 139 out of the 273 are paying more than a 6-cent base rate.

Car riders in 69 out of the 273 are paying more than a 7-cent base rate.

Car riders in thirty-six out of the 273 are paying more than an 8-cent base rate.

The following table summarizes the situation:

Cities having a 10-cent base rate	25
Cities having a 9-cent base rate	1
Cities having an 8-cent base rate	14
Cities having an 8-cent rate on elevated lines and 6-cent rate on surface lines	1
Cities having two 7-cent zones	3
Cities having 7-cent central and three-cent outer zones	1
Cities having a 7-cent base rate with 2-cent transfer charge	1
Cities having a 7-cent base rate with 1-cent transfer charge	15
Cities having a 7-cent base rate	55
Cities having a minimum base rate of 6-cents for 2 mile zones and 3-cents per mile zone thereafter	8
Cities having two or more 6-cent zones	6
Cities having a 6-cent base rate with 2-cent transfer charge	2
Cities having a 6-cent base rate	65
Cities having two 5-cent zones	1
Cities having 5-cent base rate with 3-cent transfer charge on certain lines	1
Cities having 5-cent base rate with 2-cent transfer charge	2
Cities having 5-cent base rate with 1-cent transfer charge	1
Cities having a 5-cent base rate with additional charge outside city limits	4
Cities having 5-cent base rate on most important lines with varying fares on others	1
Cities having a 5-cent base rate	66
Total	273

In St. Louis the fare has, by order of the Missouri Public Service Comission, been decreased from 8 cents, two tickets for 15 cents, seven tickets for 50 cents, fifty tickets for $3.50, to a straight fare of 7 cents, with no tickets. In Fall River, Mass., although the base rate of 10 cents cash has been retained tickets are being sold, good to the traffic center, at sixteen for $1. There have been no other decreases.

Only Two Five-Cent Cities in New York

Of the principal cities of New York State only New York and Rochester are left with their original car fares. A 7-cent fare to take effect July 1 was agreed upon and a service-at-cost agreement is looked for in the latter city in the immediate future.

In forty-seven of the seventy cities control of the rate of fare is in the hands of city authorities and in the remaining twenty-three cases it is under the control of state commissions. In fifteen of the instances where the commissions are in control there is no application for increase pending, and in five more cases application has only

(Continued on page 100)

Base Fare Rate in Cities of More Than 25,000 Population, Census Estimate of 1917.

Ten Cents—25 Cities

Boston, Mass.	Newton, Mass.
Pittsburgh, Pa.	Wheeling, W. Va.
Fall River, Mass.	Fitchburg, Mass.
Lowell, Mass.	Everett, Mass.
Cambridge, Mass.	Quincy, Mass.
Lynn, Mass.	Joliet, Ill.
Lawrence, Mass.	Taunton, Mass.
Somerville, Mas.	Brookline, Mass.
Brockton, Mass.	Waltham, Mass.
Malden, Mass.	Nashua, N. H.
Salem, Mass.	Medford, Mass.
Haverhill, Mass.	Walla Walla, Wash.
Chelsea, Mass.	

Nine Cents—One City

Portland, Me.

Eight Cents—15 Cities

Chicago, Ill., (elevated lines).	Wilkes-Barre, Pa.
Cincinnati, Ohio	Johnstown, Pa.
Washington, D. C.	Dubuque, Ia.
Kansas City, Mo.	Aurora, Ill.
Youngstown, Ohio	Norristown, Pa.
Kansas City, Kan.	Easton, Pa.
Manchester	Shenandoah, Pa.
	Elgin, Ill.

Seven-Cent Zones, Two—Three Cities

Worcester, Mass.	Springfield, Mass.
Chicopee, Mass.	

Seven Cents Central Zone, Outer Zones Three Cents—One City

Milwaukee, Wis.

Seven Cents, Two Cents Transfer—One City

Toledo, Ohio

Seven Cents, One Cent Transfer—15 Cities

Newark, N. J.	Bayonne, N. J.
Jersey City, N. J.	West Hoboken, N. J.
Paterson, N. J.	East Orange, N. J.
Trenton, N. J.	Perth Amboy, N. J.
Camden, N. J.	Orange, N. J.
Elizabeth, N. J.	Montclair, N. J.
Hoboken, N. J.	New Brunswick, N. J.
Passaic, N. J.	

Seven Cents—55 Cities

St. Louis, Mo.	St. Joseph, Mo.
Baltimore, Md.	Troy, N. Y.
Buffalo, N. Y.	Erie, Pa.
Omaha, Neb.	Allentown, Pa.
Scranton, Pa.	Chattanooga, Tenn.
San Antonio, Tex.	Charleston, S. C.
Nashville, Tenn.	Atlantic City, N. J.
Tacoma, Wash.	Mobile, Ala.
Houston, Tex.	Rockford, Ill.
Reading, Pa.	Gary, Ind.
Albany, N. Y.	York, Pa.
Wilmington, Del.	Augusta, Ga.
Davenport, Ia.	Wilmington, N. C.
Racine, Wis.	East Chicago, Ill.
Lincoln, Neb.	Newburgh, N. Y.
Macon, Ga.	Rock Island, Ill.
Butte, Mont.	Butler, Pa.
Montgomery, Ala.	Lewiston, Me.
New Castle, Pa.	Moline, Ill.
Chester, Pa.	Oak Park, Ill.
Charlotte, N. C.	Bloomington, Ill.
Auburn, N. Y.	Muskegon, Mich.
Jamestown, N. Y.	Hammond, Ind.
Quincy, Ill.	Durham, N. C.
Oshkosh, Wis.	Hagerstown, Md.
Columbia, S. C.	Cohoes, N. Y.
Winston-Salem, N. C.	Burlington, Ia.
Jackson, Miss.	

Six Cents, Two Zones (Three Miles), Three Cents a Mile Thereafter—Eight Cities

New Haven, Conn.	New Britain, Conn.
Brdgeport, Conn.	Stamford, Conn.
Hartford, Conn.	Meriden, Conn.
Waterbury, Conn.	Norwalk, Conn.

Six-Cent Zones—Six Cities

Providence, R. I.	Woonsocket, R. I.
Holyoke, Mass.	Cranston, R. I.
Pawtucket, R. I.	Central Falls, R. I.

Six Cents, Two Cents Transfer—Two Cities

Norfolk, Va.	Portsmouth, Va.

Six Cents—66 Cities

Chicago, Ill. (surface lines).	Springfield, Mo.
Detroit, Mich.	San Jose, Cal.
New Orleans, La.	Colorado Springs, Col.
Portland, Ore.	Amsterdam, N. Y.
Denver, Col.	Cedar Rapids, Ia.
Oakland, Cal.	Shreveport, La.
Columbus, Ohio	Fresno, Cal.
Atlanta, Ga.	Stockton, Cal.
Birmingham, Ala.	Jackson, Mich.
Syracuse, N. Y.	Bellingham, Wash.
Spokane, Wash.	Joplin, Mo.
Memphis, Tenn.	Kenosha, Wis.
Grand Rapids, Mich.	La Crosse, Wis.
Salt Lake City, Utah	Zanesville, Ohio
Ft. Worth, Tex.	Madison, Wis.
Schenectady, N. Y.	Charleston, W. Va.
Utica, N. Y.	Poughkeepsie, N. Y.
East St. Louis, Ill.	Newport, R. I.
Harrisburg, Pa.	Battle Creek, Mich.
Peoria, Ill.	Green Bay, Wis.
Springfield, Ill.	Fort Smith, Ark.
Berkeley, Cal.	Evanston, Ill.
Altoona, Pa.	Hazelton, Pa.
Little Rock, Ark.	Beaumont, Tex.
Saginaw, Mich.	Sheboygan, Wis.
Pueblo, Colo.	Alameda, Cal.
Binghamton, N. Y.	Steubenville, Ohio
Springfield, Ohio	Bangor, Me.
Lancaster, Pa.	Kingston, N. Y.
Topeka, Kan.	Cumberland, Md.
Bay City, Mich.	Asheville, N. C.
Lansing, Mich.	Union, N. J.
Lexington, Ky.	Paducah, Ky.

Two Five-Cent Zones—One City

San Diego, Cal.

Five Cents, Three Cents Transfer Certain Lines—One City

Philadelphia, Pa.

Five Cents, Two Cents Transfer—Two Cities

New Bedford, Mass.	Pittsfield, Mass.

Five Cents, One-Cent Transfer—One City

Cleveland, Ohio

Five Cents, Additional Charge in Suburbs—Four Cities

Yonkers, N. Y.	Elmira, N. Y.
New Rochelle, N. Y.	Mt. Vernon, N. Y.

Five Cents on Most Important Lines, Varying Fares on Others—One City

New York, N. Y.

Five Cents—66 Cities

Los Angeles, Cal.	Roanoke, Va.
San Francisco, Cal.	Galveston, Tex.
Minneapolis, Minn.	Decatur, Ill.
Seattle, Wash.	Hamilton, Ohio
Indianapolis, Ind.	Niagara Falls, N. Y.
Rochester, N. Y.	Lorain, Ohio
Oklahoma City, Okla.	Everett, Wash.
Duluth, Minn.	Lima, Ohio
Akron, Ohio	Waterloo, Ia.
Jacksonville, Fla.	Boise, Idaho
Ft. Wayne, Ind.	Austin, Tex.
Evansville, Ind.	Williamsport, Pa.
Wichita, Kan.	Waco, Tex.
South Bend, Ind.	Highland Park, Mich.
Savannah, Ga.	Lynchburg, Va.
El Paso, Tex.	Danville, Ill.
Sacramento, Cal.	Tulsa, Okla.
Terre Haute, Ind.	Ogden, Utah
Canton, Ohio	Newport, Ky.
Covington, Ky.	Council Bluffs, Ia.
Knoxville, Tenn.	Watertown, N. Y.
Sioux City, Ia.	Newark, Ohio
Flint, Mich.	Portsmouth, Ohio
Tampa, Fla.	Long Beach, Cal.
Kalamazoo, Mich.	Clinton, Ia.
Pasadena, Cal.	Pensacola, Fla.
McKeesport, Pa.	Columbus, Ga.
Huntington, W. Va.	Petersburg, Va.
Muskogee, Okla.	Muncie, Ind.
Superior, Wis.	Richmond, Ind.

recently been made, so that it may be said that no tendency on the part of the commissions to refuse relief is revealed. This is plainly evidenced by the geographical location of the cities in which the base rate is still 5 cents. Forty-nine of such cities are located in states where the commissions are without jurisdiction over fares stipulated in franchises.

Upward Tendency Plainly Indicated

The trend toward fares higher than 6 cents is indicated by an examination of the fifty-nine applications for increases now pending. Of these, seventeen are second applications. Of the entire number, one is for a 10-cent fare with a 2-cent charge for a transfer; nine are for 10-cent fares; six for 8-cent fares; one for a 7-cent fare with a 3-cent transfer charge; sixteen for a 7-cent fare; one for a 6-cent fare with a 1-cent transfer charge; thirteen for a 6-cent fare and in eleven cases the relief asked is not specified.

The table on page 99 shows the various base rates of fare and the cities in which they are being charged, as compiled by the American Electric Railway Association. The ticket fare is not given and in consequence the actual revenue received per passenger cannot be definitely stated.

Rainier Line Asks Another Increase

The Seattle & Rainier Valley Railway, Seattle, Wash., has applied to the State Public Service Corporation for permission to increase its fares. The new schedule is intended to supersede the 7-cent fare put into effect on the company's lines on June 6, the company declaring that the further increase is necessary in order to operate the privately-owned system without loss. If approved, the new tariff will be put into effect on July 19, the day set for increasing fares on the municipal lines. The proposed schedule follows:

Ten-cent cash fare for adults and for children more than six years of age, and for children less than six years of age, when occupying seats required by other passengers, or when travelling alone.

Fare at the rate of 6⅔ cents each for metal tokens, purchased in lots of fifteen for $1.

School fare metal tokens good only for children going to and from school, 3⅓ cents each if purchased in lots of ten.

Lap dogs carried free of charge; other dogs, except between the hours of 7 and 8:30 a.m. and 4:30 and 6:30 p.m. 10 cents. During the hours designated, they may not be taken on the cars at all.

Fares for Zone 2 (between the city limits and the town of Bryn Mawr) 15 cents, and 5 cents between two points in that zone. For Zone 3 (from Bryn Mawr to Renton) 20 cents. Fares between points in Zones 2 and 3, 10 cents.

The schedule provides for interchange of transfers between the Rainier Valley cars and municipal lines at a cost to the passenger of 2 cents if his original fare was paid with a token. Transfers will be issued without charge, however, on the 10-cent cash fare.

The company put the present 7-cent fare in effect on June 6, with the approval of the commission. This tariff was passed without protest.

Service at Cost Suggested

Louisville Railway Committee Sees Ohio as Most Promising Avenue of Relief

The executive committee of the Louisville (Ky.) Railway, composed of W. S. Speed, John W. Barr, Jr., and William H. Kaye, has submitted to Mayor Smith an exhaustive report in which it asks for an increase in fares from 5 cents to 7 cents and announces that it will offer an ordinance to the City Council which, if passed, will enable the company to operate on what is termed a "service-at-cost" plan. The report says a 7-cent fare is required if the company is to get sufficient revenue to render adequate service, make necessary charges for maintenance, remain a going concern and provide a reasonable return on the investment. The request has as its basis operation under a 5-cent fare for a considerable trial period. The report declares that a continuation of the 5-cent fare would mean a deficit this year of $571,896 if dividends were paid. An initial 7-cent fare is suggested.

THE report to the Mayor was signed by W. S. Speed, chairman; John W. Barr, Jr., and W. H. Kaye, the executive committee, and is supplemental to the report made in March, 1919, by the Arnold Company, Chicago, engineers, which reached much the same conclusions as to the need for an increase in fares in Louisville. Its technical portion was prepared by the Arnold Company from facts gathered from the company's books.

$500,000 Loss Likely

Unless there is a raise in fare, the report shows, the company will fall short by more than $500,000 both this year and in 1921 of the amount needed to pay interest on the investment. Even with the use of one-man cars in 1921 the deficit would still be about $469,000, and these cars would cost the company about $400,000, a sum which it would find difficult to borrow on the financial showing it can make with the present rate of fare. The report says changes suggested in the March, 1919, report have been carried out and have effected some savings, suggests others in addition to the introduction of one-man cars which might be resorted to, but says that none will meet the situation nor bring the Louisville company the revenue it needs so that it can give the city adequate service and provide a reasonable return on the investment.

The report discusses some of the solutions other than a fare raise to meet the problem of the company's increasing expense list and its fixed revenue. The zone system which has been tried but not found successful in other cities and the payment of a charge for transfers, now issued free, are each discussed in detail and dismissed as impractical or clearly insufficient to raise the revenue needed, put the company firmly on its feet and keep it a going concern which can renew worn-out parts of its plant from year to year, keep its employees satisfied, give good, safe, comfortable service and provide some return for security holders.

$1,800,000 Needed for New Work

The report points out also that in addition to taking care of maintenance charges, ordinary expense and providing revenue for interest and dividends, the company will absolutely need about $1,891,000 in the five years from 1920 to 1924 for the purchase of double truck cars, one-man cars, air brakes and motor equipment, for track extensions, carhouse construction, etc., to keep the system going. Renewal charges in connection with these items for the same period would amount to $1,025,000 additional.

Money for the purchase of these cars and the equipment must be raised on security issues and unless the credit of the company is improved through a higher rate of fare it will have great difficulty in getting the necessary financial assistance, the report asserts.

In discussing a zone fare system for the city, the report says:

Probably the only line on which a second fare could be collected is the Fourth Street line. Traffic counts at the city limits are not available, but it seems probable that, at a maximum, not over 4,000 to 5,000 additional fares per day would be collected. If an additional fare of 5 cents were charged for a ride beyond the city limits, the revenue obtained would probably not exceed $90,000 a year, which is obviously inadequate to meet the probable deficit.

After declaring it is difficult to estimate with any degree of accuracy the amount of revenue that might be obtained by a charge for transfers, the report says during 1920 probably 40 per cent of the passengers carried will transfer. The report continues in part:

It is probable that a 1-cent charge for transfers would result in the immediate reduction in the number of transfer passengers by possibly 50 per cent and in some reduction in cash fares. In our opinion, the additional revenue from a 1-cent transfer would not exceed $120,000 a year. A higher charge for transfers will result in a further reduction in the number of transfer passengers so that the increase in revenue will not be proportional to the increased charge. And it is believed that the required increase in revenue would not be obtained by any transfer charge.

Even assuming that the revenue required could be raised by a charge for transfers, the justice of such a charge on a system such as operated in Louisville is open to serious question. The operation of through routes makes it possible for passengers to take a very long ride for a single fare if they so desire and this character of long haul cannot be reduced except by the installation of a zone system of fares, which is deemed impractical under Louisville conditions.

Transfer passengers on the average probably do not ride much, if any further, than cash passengers, although their points of origin and destination require them to use two car lines. The effect of a transfer charge would be to penalize a passenger whose home and place of business do not happen to be on the same car line. The long ride now possible for a single fare would not be reduced materially, but many passengers taking a relatively short ride would have their fare unduly increased.

As a matter of fact, the number of passengers taking an excessively long ride, either for a single fare or with a transfer, is probably not a serious matter. Several very long hauls are possible, but the vast bulk of the riding is between the business and residence districts.

In view of all the conditions, it appears that the most practical and equitable means of raising the required revenue is by an increase in the rate of fare. The alternative, a zone fare system, has not been very successful on street railways in the United States, and further, it is not believed that Louisville conditions warrant such fare system.

ECONOMY IN RESCHEDULING

A study of traffic and service indicates that by rerouting and rescheduling there can be effected a saving in expense of $40,000 a year, of which only $20,000 could be saved in 1920.

By the use of a number of one-man safety cars for appropriate routes it is estimated that a further saving of $84,700 a year can be effected. This saving cannot be effected in 1920, and can only be made after the cars are purchased at a cost of about $400,000.

Including these savings the amount available for dividends is estimated to be: 1920, $102,520; 1921, $151,000 (without one-man cars); 1921, $204,700 (with one-man cars).

On the basis of dividends of 5 per cent on the preferred stock and 6 per cent on the common stock, $674,416 per year, the company would face a deficit as follows: 1920, $571,896; 1921, $522,916 (without one-man cars); 1921, $469,718 (with one-man cars).

Under Louisville conditions it is believed that a transfer charge would be inequitable and an undue burden on passengers whose points of origin and destination require the use of two car lines.

It is recommended that by an increase in fare, sufficient revenue be provided to furnish adequate service to the community and to provide a reasonable return to the company on its invested capital.

With the view of affording the greatest convenience to the greatest number of people the movement of street cars should be favored over that of automobiles since a delay to a car carrying sixty-five passengers is as serious as a similar delay to sixteen automobiles carrying four passengers each. Further, it should be recognized that the primary function of the public street is the movement of traffic and not the storage of vehicles.

PARKING PROHIBITION ASKED

The report says where there is available street space every effort should be made, with police department cooperation, to keep vehicles off the car tracks but says that on some streets, notably Fourth, conditions are particularly bad and result in many delays. In this connection the report says in part:

The most obvious remedy for this situation is the prohibition of automobiles parking on Fourth Street during rush hours. By this means the space now used by standing vehicles would be available for moving vehicles and the car tracks usually kept clear for street cars. Some measure of relief could be obtained by prohibiting parking, for perhaps 150 ft. adjacent to a car-loading berth, thus enabling automobiles to get off the car track for that distance and permitting a less obstructed approach to the corner for cars.

In making its conclusions and recommendations the committee shows the company's estimated revenue for 1920 to be $4,102,000 and for 1921 to be $4,220,000. Operating expenses, taxes, maintenance and other charges with interest on bonds would leave for dividends on the present fare basis in 1920, $82,500, and 1921, $80,000. This is about one-seventh of the amount required to take care of dividend requirements.

Ask Higher Freight Rates

A general increase in freight rates is asked by twenty-one electric railways operating interurban lines in Indiana in petitions recently filed with the State Public Service Commission. Among the petitioners are the Chicago, South Bend & Northern Indiana Railway, South Bend; the Union Traction Company of Indiana, Anderson, and the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis. The companies seek an advance in rates sufficient to place them on an equality with steam roads operating within the State.

Recent activities on the part of freight departments of the various interurban lines leads to the general belief that these lines are taking steps to build up their long-neglected freight business. In spite of the fact that Indiana is crisscrossed in every section by traction lines, they never have made an active bid for extensive freight business. During the recent car shortage on the part of the steam roads more and more demands have been made upon traction lines for short-haul freight, with the result that officials are being favorably impressed with the possibilities of the freight end of the business.

Shippers in the smaller industrial cities surrounding Indianapolis, such as Terre Haute, Richmond, Kokomo, Anderson, Muncie and Frankfort, found it impossible to ship goods during the car shortage. Indianapolis was very fortunate in being able to ship, even though the car movement was curtailed, the most of the time when the shortage was at its worst. The result was that shippers in these smaller industrial centers shipped their goods by trolley freight to Indianapolis and from there to the destination over steam roads.

Hearing July 15 on Application of Pacific Electric for Rate Increase

The California State Railroad Commission has set July 15, 1920, as the date for a public hearing in the matter of the Pacific Electric Railway's application for an increase in both interurban and local fares. The interurban company's petition applies for an increase in freight rates at the same time. Hearing will be held in Los Angeles before three commissioners of the State.

An increase in freight rates equivalent to that which may be granted by the Interstate Commerce Commission to steam roads in their application for a 24 per cent increase in the California territory has been petitioned for by the Pacific Electric. It has been brought out that the same increases in operation costs of steam roads are obtaining in the cost of handling freight over electric lines, necessitating that an increase in conformity to that applied for by the steam roads be granted.

Of the Pacific Electric Railway's gross traffic, only 22 per cent is taken up in the handling of freight. Forty-five per cent of the freight handled by Pacific Electric Railway is interstate in character and the rates for this, it is cited, should be maintained at a parity with steam lines competing for this business. Without an increase in the rates for handling freight, additional increases over those already submitted in passenger rates would have to be petitioned for, it is asserted.

Jitneys or Trolleys?.

Auto-Ridden Bridgeport Must Decide by July 15 Which It Will Retain

Trolleys may cease to run in Bridgeport, Conn., on July 15. The Connecticut Company has been forced to indicate that it may be necessary to suspend service owing to the inroads made by jitneys operated under conditions of competition distinctly unfair to the railway. The company had indicated previously that this was its decision. In a formal statement made on July 3 the company said:

As is well known, jitneys have been operated in the city of Bridgeport for the several years last past in direct competition with the cars of the Connecticut company and to a greater extent than in any other city of the State. This competition has materially affected the revenues of the company, the amount received having been for a long time insufficient to meet ordinary operating costs and recently having so fallen off as to but barely meet the payrolls, leaving not enough to pay for materials and supplies.. In other words, at the present time the company is actually losing money by the operation of its cars in Bridgeport.

The company has sought to meet this competition and to improve the character of its service, having purchased a large number of safety cars, but unfortunately the financial results have not only failed to improve but have grown steadily worse. Manifestly, this cannot continue. The company has no profits at other places which it can draw upon to make up its losses in Bridgeport. The continuance of its operations must depend upon the revenues received.

DIRECT COMPETITION UNFAIR

The great cause of the competition which has proven so ruinous to the company is that the routes assigned to the jitneys by the public authorities are all on streets upon which the railway tracks are located, so that all the revenues which they receive comes from those who would otherwise pay car fares and thus directly takes away the the revenues of this company. The extent of this competition is shown by the fact that the jitneys are carrying over one-half the total number of passengers.

Under such severe and unregulated competition it is impossible for this company to operate. It is obliged to pay a percentage of its gross receipts in the form of a tax and in addition must maintain the greater portion of the pavements on the streets in which its tracks are located and contribute towards the cost of all bridge renewals. It performs a full measure of service for more than eighteen hours of each day and during snow storms keeps the streets open for the passage, not only of its own cars, but for jitneys, delivery wagons and other vehicles. Its service must be continuous and dependable. No means of conveyance not confined to definite track areas can supply the amount of service required, especially in a city with narrow central streets.

The jitney operates wherever and whenever the individual owner pleases without regard to the necessity or convenience of the community, and the jitneys alone cannot give an entire city such service as is necessary for its continued growth and prosperity.

There are areas in the city of Bridgeport without means of public transportation through which motor bus routes would be of great service and would meet a real necessity, and we are advised that it is within the power of the city to establish such routes and to confine jitney operation thereto. By so doing a material improvement in public transportation would be afforded and by eliminating ruinous competition the continued operation of street cars would be made possible. Without some action of this kind continued operation is not possible.

In making this statement the trustees desire only to point out the real situation. They have no wish to take an unreasonable attitude. The point is simply that the railway service cannot be carried on in the face of existing jitney competition. And if such service be discontinued it will be because under existing conditions this company cannot make enough money to pay its expenses.

The trustees desire to call attention in this connection to the fact that the Con-

neticut Company has no legal process available to it for restriction or control of jitney competition or service either by appeal to the courts or to the Public Utilities Commission while the city government, as they are advised, has adequate power in the premises.

As the jitney competition is more intensive in Bridgeport than in any other portion of the State, the exact plan has been determined for that locality only, no details having as yet been worked out relative to action in any other city. It will, however, be essential to give careful attention to this matter in all parts of the State, and as the solution lies within the power of the local authorities in each instance, it is probable that proper steps will be taken in each locality.

Six Cents in Canton

The City Council of Canton, Ohio, on July 2, by a unanimous vote, passed an ordinance giving the Northern Ohio Traction & Light Company a 6-cent cash fare with seventeen tickets for $1, but the Mayor vetoed the measure. The newspapers declared that the settlement was satisfactory to all concerned and the Council will undoubtedly proceed to pass the bill over the Mayor's veto.

On July 3, the City Council of Massillon informed the company that it will not grant a 10-cent fare and that the offer of 8 cents, with four tickets for a quarter, is the best that can be made. The local men have since gone on strike.

Pittsburgh Petition Presented

Holding the objections of the Pennsylvania State Public Service Commission to an increase in fare in Pittsburgh from 7½ to 8⅓ cents, or three tickets for a quarter, "merely a question of procedure," the receivers of the Pittsburgh Railways formally announced last week that they had filed a petition with the commission, asking approval of the contemplated increased fares.

Filing of the new petition, however, after the previous petition met with a setback at the hands of the commission, means a delay of at least a month in putting the 8⅓-cent fare into effect. The receivers fixed the date at July 14.

The commission has fixed Aug. 10 as the time for a hearing on the petition. As the increased fare cannot now go into effect, under the commission's ruling, until the commission approves it, this approval, if given, must not come later than Aug 10, the day of the hearing.

The Mayor and the Council urged that the trainmen be given a substantial increase in wages. Whether they will oppose the fare increase when the commission takes up the matter will not be determined until next week when the city officials will advise on what attitude should be taken by them.

On two different occasions the Mayor and the merchants have promised that, if the company granted an increase to the men, they would join the company in an appeal to the State authorities for permission to increase the fare in order to meet the added expenses due to a bigger payroll. When the time came, however, both the merchants and the Mayor opposed an increased fare.

Transportation News Notes

Interstate Line Wants More.—The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has applied to the Interstate Commerce Commission for an increase in fare from 2.5 cents to 2.7 cents a mile.

Higher Rate Denied.—The Illinois Public Utilities Commission has issued an order pending until Dec. 29, 1920, the proposed increase in fare from 6 cents to 7 cents on the lines of the Jacksonville Railway & Light Company, Jacksonville.

Increase Asked in Gary.—The Gary (Ind.) Street Railway has petitioned the Public Service Commission for a 10-cent fare in Gary, Hammond and East Chicago. The petition asks authority to sell ten tickets for 70 cents, with a 5-cent fare in interurban zones.

L. A. Carmen Read "Two Bells."—Carmen and other employees in the service of the Los Angeles (Cal.) Railway are now looking forward each week to the appearance of *Two Bells*, the company's new magazine. The paper is edited by J. G. Jeffery, director of public relations of the railway.

Ten Cents Asked in Greenfield.—The Connecticut Valley Street Railway, Greenfield, Mass., has petitioned the State Department of Public Utilities for an increase in fare from 6 cents to 10 cents. The company proposes to sell labor tickets at 7½ cents each. The road has paid no dividends on its common stock since 1916, and no dividends on preferred stock since 1918.

Ten-Cent Fare Stands.—The Chicago & Joliet Electric Railway, Joliet, Ill., has been authorized by the State Public Utilities Commission to continue until further notice the 10-cent fare now being charged on its Joliet lines. The commission has authorized the Central Illinois Public Service Company, Mattoon, to continue charging a 6-cent fare on its lines in Mattoon.

Seven Cents in Lexington.—Car riders in Lexington, Ky., are now paying a local fare of 7 cents, and a minimum fare of 7 cents on the interurban lines of the Kentucky Traction & Terminal Company. The new rates became effective on June 14. The fare was formerly 6 cents. There was little opposition to the increase on the part of the public.

Zone Fares Six Cents.—The Public Service Commission for the Second District of New York has authorized Leverett S. Miller, receiver of the Westchester Street Railroad, to increase the rate of fare from 5 cents to 6 cents in zones where franchise restrictions have been waived by local authorities. These waivers terminate on Aug. 1, 1920. The commission's permission to charge the 6-cent fare is effective only to and including July 31.

Seven Cents in Springfield.—An increase in cash fare from 6 cents to 7 cents on the lines of the Springfield (Ill.) Consolidated Railway was authorized by the State Public Utilities Commission on June 16. The commission announced that the new rate would be effective ten days after the company's acceptance of the order. The company was directed to sell four tickets for 25 cents and thirty-five school tickets for $1.

Safety-First Placards. — A safety-first campaign has been started by the Monongahela Valley Traction Company, Fairmont, W. Va., on its Fairmont division for the purpose of instructing passengers in the proper methods of getting on and off and riding on its cars. A series of placards is being displayed in the cars, illustrating the mistakes most frequently made and their evil results. These placards will be changed from time to time.

Fares Decreased, But Zones Increased.—The Interstate Consolidated Street Railway and Attleboro Branch Railroad, have been granted a fare increase through re-arrangement of fare zones. The actual cash fare has been reduced from 7 cents to 5 cents, but the zones have been shortened and the number increased. On April 18, the companies were permitted to increase their fares from 6 cents to 7 cents pending an investigation by the Public Utilities Commission.

Jersey City Interested in Newark Case.—Counsel for Jersey City has requested recognition by the court as co-defendant in the case of the Public Service Railway of New Jersey to enjoin the jitneys from operating in Newark, N. J. This is asked upon the ground that the jitneys pay 5 per cent of their gross revenue to the city. This fact seems to offer little support, however, to the defendant jitneys, as the railway also pays a similar percentage. The city of Newark takes a less prominent position, being interested only in the question of authority of the municipality to regulate both utilities. This right the Public Service Railway does not dispute, the question of regulation not being raised. It is expected that the case will come up for trial July 10.

New Publication

Essentials of Alternating Currents

By W. H. Timbie and H. H. Higbie. John Wiley & Sons, Inc., New York, N. Y.

The authors of this book are well known for their ability to explain in clear, simple language the essentials of electrical circuits and machinery. The book should be useful to practical men who wish to study for the first time or to review the principles underlying their everyday duties. It is non-mathematical in character and is replete with problems and diagrams.

Personal Mention

New Board Member

Colonel Stayton Will Assume New Post at Kansas City on Aug. 15—Succeeds R. P. Woods

Col. Edward M. Stayton has recently been made the city representative on the Board of Control of the Kansas City (Mo.) Railways of which Philip J. Kealy is the other member. Colonel Stayton takes the place of R. P. Woods, who recently resigned to devote his time to the Kansas City, Clay County & St. Joseph Railway, of which he is vice-president and general manager.

Kansas City is indeed fortunate in securing the services of a man of Colonel Stayton's caliber and engineering experience. Born on Sept. 4, 1874, near Independence, Mo., he attended the Independence schools and later Missouri University. From 1894 up to the present time he has been actively engaged in engineering work, a large part of his time being spent in and about Kansas City. Mr. Stayton probably knows Jackson and Clay Counties from the highway and railway standpoint better than any other man. In 1903-04 he was chief engineer for the proposed Kansas City, Parkville & St. Joseph Railway, making surveys, estimates, etc., also superintendent of construction for the State of Kansas in the building of a brick street costing $20,000. In Spanish Honduras during the following two years he located and built 8 miles of narrow-gage road for the Las Palmas Plantation Company.

From April, 1905, to September, 1906, Mr. Stayton was chief engineer for Kansas City, Parkville & St. Joseph Railway and the Kansas City, St. Joseph & Excelsior Springs Railway. From September, 1906, to July, 1907, he was locating engineer for Div. No. 1 of the Missouri River & Gulf Railway (proposed) between Kansas City and the Gulf of Mexico. From January, 1905, to June, 1905, he was employed as chief engineer of surveys of the Kansas City & St. Louis Electric Railway. During the five years from 1911 to 1916 he was connected with the Kansas City, Clay County & St. Joseph Railway and engaged in general consultation practice on highways and railways.

Before leaving for the Mexican border in June, 1916, Colonel Stayton, then Major of Artillery, U. S. was Highway Engineer of Jackson County, Missouri. Only a few months after returning from the border he again entered the service and as Major 110th Engineers, U. S. A., later Lieutenant-Colonel, and left with his regiment for France. Since his return Colonel Stayton has been consulting engineer for the location and construction of highways for Clay and other counties in Missouri.

On May 28, Mr. Stayton was elected Colonel of the Seventh Regiment of the Missouri National Guards. Colonel Stayton is a member of the American Society of Civil Engineers. He will not assume his duties on the Board of Control until Aug. 15.

Mr. Kidder Advanced

Electrical Superintendent of Interborough Will Succeed Mr. Finlay as Superintendent of Power

Announcement has been made of the appointment of H. A. Kidder, electrical superintendent in the motive power department of the Interborough Rapid Transit Company and the New York Railways, New York, N. Y., to be assistant superintendent of motive power of these companies. The appointment is made pending final severance of the relations of W. S. Finlay, Jr., with these organizations in the near future, at which time Mr. Kidder will become superintendent of motive power.



H. A KIDDER

Mr. Kidder's appointment follows the election of Mr. Finlay to be vice-president of the American Water Works & Electric Company, New York, which operates a number of water works and other public utilities. A biography and a portrait of Mr. Finlay were published in the ELECTRIC RAILWAY JOURNAL for May 29, page 1122. Mr. Finlay was recently tendered a dinner by his associates in the Interborough. On this occasion President Frank Hedley referred to Mr. Kidder as Mr. Finlay's successor.

In his new position Mr. Kidder will have direct supervision of the manifold activities connected with the furnishing of power for the Manhattan rapid transit and surface lines. His headquarters will be at the Fifty-ninth Street power station of the Interborough, the chief generating plant of the system. This great installation, one of the largest of its class in the country, was constructed under the direction of the late Henry G. Stott, who, until his death in 1917, occupied the position of superintendent of motive power.

Like Mr. Finlay, Mr. Kidder has been connected with the Interborough since the early days of the system. Joining the company in 1906 as assistant electrical superintendent, he had a part in the development of the Fifty-ninth Street station and in the other power installations of the company. He therefore has a thorough working knowledge of the system's motive power problem and is well equipped to perform his new duties, which, in addition to those that directly involve power generation, include the direction of the engineering and construction work coming within the scope of the motive power department.

Mr. Jones, General Manager

On July 1 T. Norman Jones became general manager of the Norfolk and Portsmouth division of the Virginia Railway & Power Company. He has been assistant general manager of the division for three years. Mr. Jones in his fourteen years' service with the Virginia Railway & Power Company has been in practically every division. Born in Richmond in 1882 he was educated in the schools of Wilson, N. C., and the University of Virginia. As a young man he became associated with the engineering corps in charge of the construction of the Potomac yards, and with the McKay Engineering Company, and the United Electric Light & Power Company. In 1906 at the age of twenty-four he took the position of mechanical and electrical engineer with the Virginia Railway & Power Company. The next year he devoted his time to the operation of the Richmond & Chesapeake Bay Railway. In 1911 he returned to the Virginia Railway & Power Company as chief engineer and he continued in that position until 1916, when he was appointed assistant general manager. Up to the present time C. B. Buchanan, vice-president of the company, held the title of general manager.

Edwin D. Smith, who has given fifteen years' service to the United Railways of St. Louis, will resign as chief engineer on Sept. 1. Born in Galion, Ohio, in 1877, he was educated in the grade schools of Missouri and was graduated from the Missouri University. In 1901 he entered the employ of the St. Louis Transit Company, the predecessor of the United Railways. He held various positions in the power stations of the company until in 1904 he was appointed superintendent of power stations. Mr. Smith is a member of the City Plan Commission, the St. Louis Electrical Board of Trade and the State Public Utilities Association. He resigns to become superintendent of power and maintenance National Cash Register Company, Dayton, Ohio.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Market for Fare Boxes and Registers Expanding

Growing Favor of Metal Ticket and Increasing Tendency to Count Fares Aiding Sales of Equipments

Growing use of the metal ticket, which is rapidly coming into favor with electric railways, is largely responsible for the greatly increased sales of registering fare boxes, according to one of the large manufacturers. A good demand is also felt for fare registers, but the increase of business there has not kept pace with the growth of the fare box industry apparently. Orders for fare registers are being received in normal volume or about the same as last year, the first six months of which represented an increase of approximately 30 per cent over the same period in 1918. On the other hand, sales of registering fare boxes have presented a steady increase thus far over the corresponding period a year ago, amounting to about 50 per cent. The turning of the half-year mark in 1919 was again 75 per cent ahead of the figures for 1918.

Manufacturers of registers are in a better position to make shipments, orders for standard material being usually filled promptly from stocks kept at a level of three months' surplus.

The fare boxes cannot be supplied from stock, however, as back orders have piled up for ninety days. Deliveries were made in from forty to seventy days last fall. In neither case are labor troubles affecting the situation.

The raw material supply is another matter, as in that respect makers of both products are meeting considerable difficulty in obtaining such material as steel and malleable iron castings from the mills, which are tied up with transportation and labor troubles. This condition has its reflection in the production of fare boxes and registers, which in the case of some manufacturers is sub-normal. Other producers, however, report operation at full capacity.

A slight increase in the price of fare boxes was reported on June 1 by one representative company, amounting to from 4 to 5 per cent. Rising costs of labor and material are given as the cause.

In this instance the prices of 1919 presented no increase over those of 1918. Another large manufacturer representing the fare register industry has made no recent price changes, but quotations were increased materially during 1919. Opinions agree that present prices have about reached their top figure. A favorable factor is the entire absence of order cancellations in this line.

The policy of electric railways is tending more and more toward counting the fare rather than the passenger. Recent large orders placed by important traction companies are evidence of this. One large manufacturer has recently filled orders to the extent of 1,650 registering fare boxes and about 2,200,000 metal tickets, distributed among five companies in amounts of approximately 700, 600, 200, 100 and 50 equipments, and providing a complete installation on three of the five lines. Another producer who specializes in fare registers has recently filled orders for approximately 600 equipments divided among three traction companies.

Coal a Little Freer

Acute Situation Eased Somewhat, but Still Causing a Great Deal of Uneasiness

Although the edge has been taken off the very acute coal situation facing the traction companies, they are not out of the woods, by any means. Even at this early date, with the thirty-day priority on open-top cars for delivery of coal only half up, certain leeway is being afforded metal interests for the use of such cars for shipments of metals. On the face of it, this is not assisting much in the laying in of coal reserve stocks.

In discussing the fuel situation, F. H. Miller, vice-president of the Louisville (Ky.) Railway, said: "At this time last year we had about 17,000 tons of coal on hand, but right now we have only about 2,500 tons. While we have a contract with a reliable coal concern, contracts don't mean much where the operator is unable to secure cars for shipment. The coal situation has been giving us a little uneasiness, and it may increase operating expenses materially."

It is a well established fact that eastern Kentucky and West Virginia gas coal has advanced to a point where it is selling at $9 to $9.50 and even $10 a ton for mine run at mine, while non-gas coal of the better grades is quoted at $8.00 to $8.50 at the East Kentucky and West Virginia mines. Western Kentucky mine run is quoted at $5 to $5.50 at mine. These prices were secured from operators recently. It is reported that public utility companies, steel companies, by-product concerns, etc., are entering the fields with cash and certified checks and bidding up prices, offering higher than the last offer in order to secure shipments.

Good Demand for Motor-Driven Chain Blocks

Stocks Are in Good Shape in Distributers' Hands, with Factory Shipments in About Five Months

Generally speaking, shipments of electrically driven chain blocks can be made from stocks which are in dealers' and distributers' hands throughout the country. Manufacturers are ordered up above their present production capacity, but are able to make factory shipments in about five weeks. Stocks of raw materials are in fair shape, but stocks of motors are not so good. Considerable difficulty is still being experienced in getting enough motors, and this is the main feature lengthening shipments. At the same time, the motors are so standardized that few different styles have to be kept, and therefore greater ease of stocking is experienced.

Demand for chain blocks is good among electric railways and is tending constantly to the use of motor-driven blocks. Prices have been holding rather steady during the last six weeks, but it would not be surprising to see an advance, because that is the direction any change would take, it is understood from the manufacturers.

Switzerland Floats $25,000,000 Loan to Electrify Federal Railroads

Development of hydro-electric power, estimated to total 2,700,000 horsepower, is aimed at in the recent loan of $25,000,000 negotiated in this country by the government of Switzerland for the purpose of electrifying the Swiss Federal Railways. The utilization of her vast amount of unused water power will greatly simplify Switzerland's fuel question and relieve her from the present necessity of importing coal from outside sources at extremely high prices. It is estimated that if the old hydro-electric plants were replaced by new ones, the total water-power resources of the country could even be raised to 8,000,000 hp. It is expected that the development of this power will effect large economies in the operation of all Swiss railways and industries.

In 1913 the government of Switzerland owned 1,800 miles of the 3,671 total mileage of the country. Of the remaining sum owned by private companies, 622 miles are already electrified, but only a small portion of the government-owned railroads have made the change from steam to electric power. Of the government's total debt, amounting to about seven and a half

millions, slightly more than half is attributable to the federal railways, although in normal years these have shown a substantial profit.

The loan has been negotiated in the form of twenty-year bonds yielding 8 per cent, callable after ten years and with a sinking fund of $1,000,000 per annum for the purchase of the bonds. One of the provisions of the transaction is that the equipment involved in the electrification of the railways be purchased in the United States.

Stranded-Steel-Wire Market Steady Under Short Supply

Railways Buying Less, but Labor, Transportation and Shortage of Raw Materials Are Cutting Production

Although demand for stranded steel wire is not extra heavy, manufacturers are having considerable difficulty in meeting orders. The volume of buying has increased slightly over a year ago, but is still subnormal if anything. Little new construction work is being undertaken, repairs and replacements accounting for most of the orders. Where formerly the electric railways would stock ahead on suspension and guy wires, money tightness is now causing them to cut expenditures to the bone; consequently stranded wire is ordered only as absolutely needed.

In spite of this circumstance production is generally inadequate to meet demands, one of the largest wire producers reporting operation at only about 65 per cent of capacity owing to raw material and transportation difficulties. Another manufacturer has been hindered by labor troubles, the mills of this company operating only seven months last year because of strikes. Zinc is reported hard to obtain; hence the process of galvanizing stranded wire is one more factor delaying some producers, although other mills which own their own zinc and coal mines are free from this trouble.

As a result of these conditions orders are running further and further behind, with deliveries ranging from ten weeks to five months. Stocks in this field seem to have gone out of existence. Transportation difficulties continue to tie up shipments at the mills; in fact, with the recent coal priorities order in force, manufacturers report no relief in that quarter.

The encouraging features of the situation seem to be the entire absence of order cancellations and the continued steadiness of the market, prices having remained firm during the past year, although the tendency would seem to be up at the present time.

Agreement Reached in Sheet Wage Controversy

Independent manufacturers in the sheet and tinplate industry and the Amalgamated Association of workers in the steel, iron and tin mills came to an agreement on the scale controversy last Friday. The suspension and curtailment of numerous mills throughout the producing centers of the middle west has been averted and the workers will go on under virtually the same agreement as existed up to June 30.

The 20 per cent wage increase and the six-hour shift for an eight-hour shift have been abandoned, but some minor concessions were made by the producers. A spell hand is introduced here and there and a few adjustments of little importance are made in both sheet and tin mill scales.

Rolling Stock

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo., announces the expectation to purchase four or five used single-truck cars.

Sacramento Northern Railroad, Sacramento, Cal., has purchased two sixty-ton electric locomotives at a cost of approximately $72,000. The locomotives, which are of the same size and type of two others bought last year, will be used in handling crops along the Sacramento Valley this summer and fall. Delivery is expected this month.

Shamokin Mt. Carmel Transit Company, Mt. Carmel, Pa., recently had its machine shop and carhouses destroyed in a fire originating from lightning. Two cars were also lost, raising the damage estimate to $30,000.

Concord Electric Railway, Concord, N. H., expects to place contracts during the next two weeks for brakes, fenders, registers and other rolling stock equipment to be used for safety cars the company is rebuilding.

Recent Incorporations

Blue Ridge Development Company, Hickory, N. C.—The Blue Ridge Development has recently been incorporated with a capital stock of $500,000. A survey of the road is being made which will connect Charlotte, Hickory and Blowing Rock. The company expects to lay 100 miles of single track. The incorporators include N. T. Shipp, Newton; G. N. Hutton, J. D. Elliott, J. L. Cilley and others of Hickory.

Franchises

Houston, Bay Shore & Texas City Traction Company, Houston, Tex.—The Houston, Bay Shore & Texas City Traction Company has received a franchise to run its new interurban line from Houston to Texas City through Harrisburg. The City Council of Harrisburg passed the franchise.

Babylon Railroad, Babylon, N. Y.—Joseph G. Robin has made application to the Babylon Village Board for a franchise to construct and operate a street railway between Babylon and Amityville. The aim is to rehabilitate the Babylon Railroad, the franchise for which has been suspended. A report on the new franchise will be made on July 12.

Track and Roadway

Connecticut Company, New Haven, Conn. — The Connecticut Company, operating the Putnam trolley line, will begin improving its right of way on Grove Street at once.

Chicago & Joliet Electric Railway, Joliet, Ill.—The Chicago & Joliet Electric Railway expects to build 3 miles of double track some time this season, being a detour around the city of Lockport on its interurban line.

Municipal Street Railway, Alexandria, La.—The Municipal Street Railway of Alexandria is rebuilding four blocks with girder rail on Second Street and has purchased material to rebuild six blocks on Monroe Street with the same kind of rail.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway will replace worn rails and ties in Main Street.

Springfield (Mass.) Street Railway.—Extension of the tracks of the Springfield Street Railway in the eastern section of Springfield is now assured by the successful efforts of the citizens and the Chamber of Commerce to raise $300,000.

Winston-Salem, N. C.—While conditions which exist at present with respect to the borrowing of money for construction purposes would seem to preclude the possibility of carrying out a program for building an electric line, yet the construction of an interurban railway connecting High Point with Greensboro and Winston-Salem is being discussed with a view to the realization of this project when conditions return more nearly to normal. Among those interested in the undertaking is F. Hahn, a contractor of Winston-Salem.

Evansville & Ohio Valley Railway, Evansville, Ind. — The Evansville & Ohio Valley Railway is completing the construction of a high tension line 10 miles from Newburgh, Ind., to Evansville in order to connect the present high tension line with the power station of the Public Utility Company, Evansville.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company will make improvements on its Canton system. In the list is included a new terminal for Canton, double tracks on certain lines, building one new line and relaying tracks in different parts of the city. The expense will be approximately $500,000 and the work will cover a period of three years.

Scranton (Pa.) & Binghamton Railroad, Scranton, Pa.—This company is constructing a 66,000-volt transmission line from Tiffany (Pa.) to Binghamton (N. Y.), a distance of 22 miles. This will complete the line from the Brookside (Pa.) power plant, 11 miles out of Scranton to Binghamton, the line

from Brookside to Tiffany, a distance of 25 miles, having been in operation since 1916. The construction will consist of 35-ft. wooden poles, spaced 150 ft. maximum and 125 ft. minimum, with Keystone triangle and No. 360 70,000-volt lock insulators and will be three-wire, three-phase. Eventually the Binghamton plant, which now supplies the energy for the local street railway, will be shut down and held as an auxiliary, current being received over the transmission line from Brookside. There is now sufficient generating equipment at Brookside to carry the additional load, and two additional 500-hp. Heine water tube, 200-lb. pressure boilers are being installed. The extension of the transmission line does not indicate that there will be anything done in the immediate future on extending the Scranton & Binghamton interurban line to Binghamton, although it is still intended that eventually this will be accomplished. The local street railway at Binghamton, N. Y., is owned by the interurban line.

The Beaver Valley Traction Co., New Brighton, Pa.—The Beaver Valley Traction Company has placed a contract with Littefield, Fry & McGough to weld approximately 2,500 rail joints. It has also placed a contract with the Republic Engineers, Inc., to weld approximately 130 joints. It is expected that the work will start within the next few weeks.

Montreal (Que.) Tramways.—The extension of the line on Kelly Street from Millen to Lamothe Street will soon be commenced. This extension is in accordance with the contract signed between the city and the company in January, 1918, construction being dependent upon the city's securing the necessary right of way.

Montreal (Que.) Tramways Company.—The Montreal Tramways Company will start work right away on the construction of a tram line from Mount Royal Avenue to within 60 ft. of the summit of the mountain. The work will cost about $250,000. The line will be part of the service of the city and passengers on other cars wishing to go to the top of the mountain will only have to obtain transfers.

Power Houses, Shops and Buildings

Butte Electric Railway, Butte, Mont.—The Butte Electric Railway within the next few months expects to fit out its carhouse with new general offices.

Cairo & St. Louis Railway, Cairo, Ill.—The Cairo & St. Louis Railway expects to equip all its boilers with super heaters, "Sealflex" arches and chain grates.

Worcester (Mass.) Consolidated Street Railway.—The Fremont Street power house of the Worcester Consolidated Street Railway has been leased for three years to the Curtis & Marble Machine Company. It will be remodeled for occupancy as a foundry.

Professional Notes

Frederic W. Erickson and Henry M. Taylor, consulting engineers, announce the opening of offices at 383 Madison Avenue, New York City, for the practice of electrical, civil and mechanical engineering.

E. S. Lincoln, Inc., 534 Congress Street, Portland, Me., consulting electrical engineer, is successor to Lincoln, Hanson & Abbott, Inc. Mr. Hanson and Mr. Abbott are no longer connected with the firm.

Trade Notes

The Under-Feed Stoker Company of America, Chicago, has filed notice of an increase in capital stock from $1,000,000 to $1,250,000.

The Kuhlman Electric Company, Bay City, Mich., has filed notice of an increase in capital stock from $75,000 to $150,000 to provide for extensions and its increasing business.

The Morganite Brush Company, Inc., 519-523 West Thirty-eighth Street, New York City, has been organized to take over the business and property of the Morgan Crucible Company.

The Allentown Cable & Machine Company, Allentown, Pa., is asking for bids for the construction of a one-story building, 50 ft. x 100 ft., at Hamilton, to cost about $35,000.

The Fafnir Bearing Company, New Britain, Conn., has recently appointed Rufus N. Hemenway manager of the industrial bearings division, which includes the sale of double bearing transmission boxes.

The Roller-Smith Company, 233 Broadway, New York City, held a sales conference at its works at Bethlehem, Pa., on June 14, 15 and 16. In addition to regular business conferences and inspection trips through the works, there were several social functions.

The Consolidated Car-Heating Company, Albany, N. Y., at its recent annual meeting elected Cornell S. Hawley president and treasurer. William S. Hammond was re-elected vice-president. Lee P. Hynes was made chief engineer and John H. McElroy secretary.

A. Dwight Smith, district sales manager of the Northern Electric Company, Montreal, Que., Can., has been transferred to the general sales department at the head office. In his new position he will have charge of sales to railways in the Dominion of Canada. N. S. Richards, who has been sales manager at Calgary for the last three years, succeeds Mr. Smith as Montreal district sales manager.

Samuel H. Taylor, general manager of the Electrical Railway & Manufacturers' Supply Company, San Francisco, Cal., was chairman of the business program committee at the convention of the Electric Supply Jobbers' Association held recently at Del Monte. Mr. Taylor has the distinction of being the oldest jobber, in years of service, on the Pacific Coast, as he has directed the destinies of the Electric Railway & Manufacturers' Supply Company since its organization in 1898.

The Edison Storage Battery Company, West Orange, N. J., announces the appointment of Don C. Wilson as assistant sales manager in charge of its railroad department. Mr. Wilson has been active in railroad operating and mechanical departments for many years, serving in various capacities with the Stone & Webster Construction Company, Seattle; the Pacific Gas & Electric Company, Los Angeles, and also as electrical engineer for the Union Pacific Railroad at Omaha, Neb., and in a similar capacity for the Central of Georgia Railway at Savannah.

J. G. Brill Company, Philadelphia, has rebegun the publication of Brill's Magazine, discontinued in May, 1918. The present number is dated June, 1920, but no definite date is set for the next issue. It will be the policy of the company to issue these magazines from time to time as suitable material is available. The company declares that the standardization of the Birney safety car, by introducing uniformity in cars, created a scarcity of suitable material for the magazine, as hitherto different types of cars were manufactured.

The Watson-Stillman Company, New York City, announces several changes in the board of directors of the company due to the retirement of A. F. Stillman from active interest in the management. Mr. Stillman remains as president of the company and also has full supervision of the sales. Carl Wigtel, chief engineer, was elected vice-president; A. Parker Nevin, secretary; W. H. Martin, purchasing agent. Mr. Wigtel has started on a ten weeks' trip to the Scandinavian countries, England, France, Belgium and Holland. While he is going mainly for a vacation, he will also investigate new developments in the line of hydraulic machinery in all of the above countries. Mr. Wigtel has been connected with the company for thirty-three years.

Lester C. Hart, previously sales manager of the Railway & Industrial Engineering Company, has become president and general manager of the Hi-Voltage Equipment Company, Cleveland, Ohio, manufacturers of air break switching and protective equipment.

New Advertising Literature

Transmission Lines.—The British Aluminum Company, Ltd., 109 Queen Victoria Street, London, England, is circulating a booklet entitled "From the Falls to the Factory," in which it gives special attention to American practice in transmission-line engineering.

Q and A





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¶ During the past five years the industry has fought unassisted against the throttling conditions with which we are all so familiar.

¶ This period has cost the electric railways millions of dollars in cold, hard cash. It has cost them infinitely more in effort and sacrifice. It has been a period of penalty, instead of reward, for faithful service.

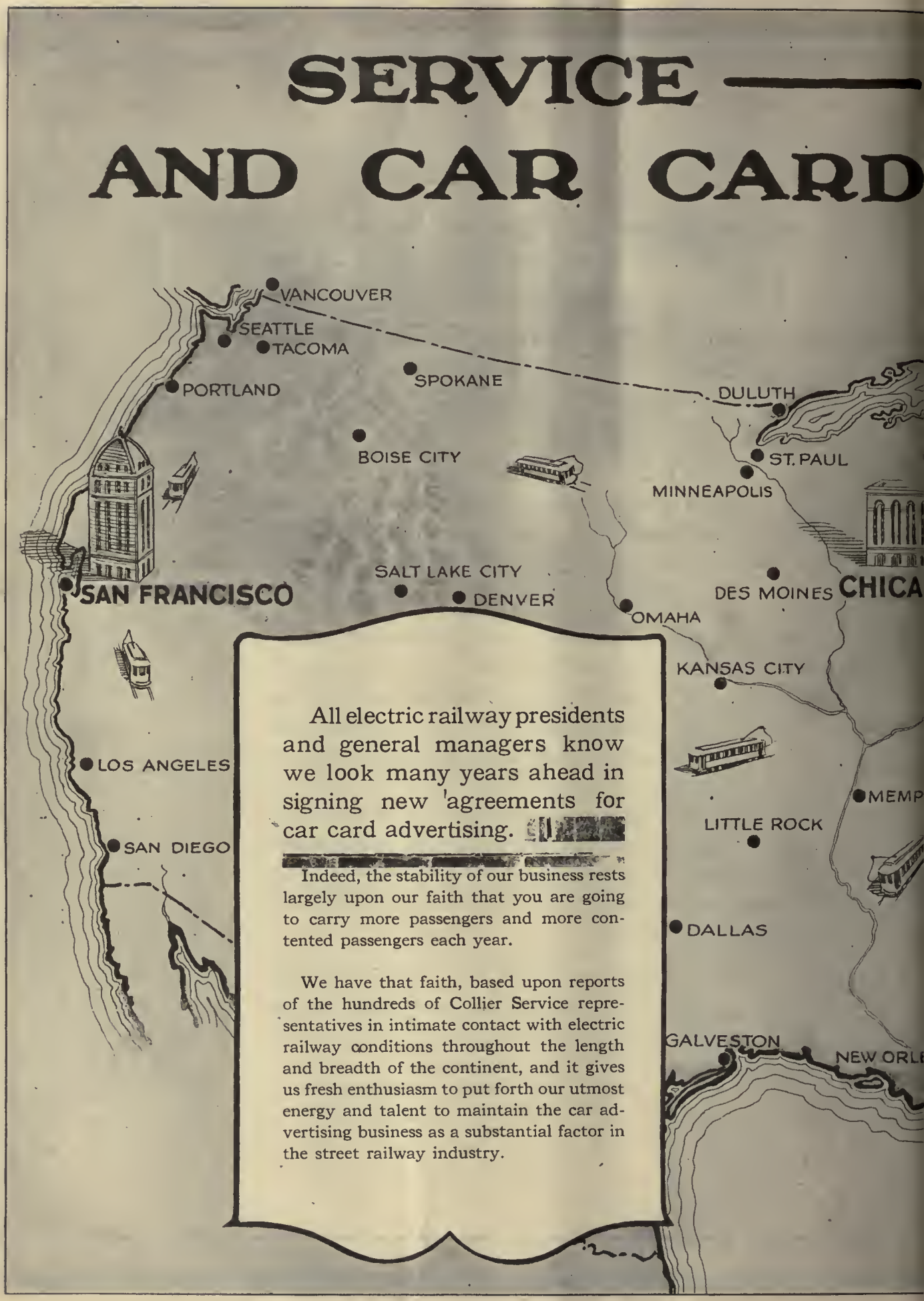
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All electric railway presidents and general managers know we look many years ahead in signing new agreements for car card advertising.

Indeed, the stability of our business rests largely upon our faith that you are going to carry more passengers and more contented passengers each year.

We have that faith, based upon reports of the hundreds of Collier Service representatives in intimate contact with electric railway conditions throughout the length and breadth of the continent, and it gives us fresh enthusiasm to put forth our utmost energy and talent to maintain the car advertising business as a substantial factor in the street railway industry.


CONTENTED PASSENGERS
ADVERTISING
ALBANY
BUFFALO
SCRANTON
ERIE
NEWARK
YOUNGSTOWN
NEW YORK
JACKSON
PITTSBURG
TRENTON
TOLEDO
ALLENTOWN
COLUMBUS
BALTIMORE
WHEELING
WASHINGTON
CINCINNATI
RICHMOND
LOUISVILLE
NORFOLK
KNOXVILLE
CHATTANOOGA
WILMINGTON
BIRMINGHAM
CHARLESTON
ATLANTA
SAVANNAH
JACKSONVILLE
Barron G. Collier
INCORPORATED
CANDLER BUILDING
NEW YORK
TAMPA

—how a few exceptionally bad situations affect the whole . . . .

It's the Sore Spots Which Stand Out Now

ONE of the most promising signs for the future of the electric railway industry in its relations to the public is the noticeable change in complexion of the situation as a whole. Now it is the few sore spots which attract attention, whereas a few months ago we were happy to see a few healed and healthy areas.

This condition, however, does not necessarily mean that all is well and further effort useless. These sore spots must still be healed, the remedies must be intelligently applied and the cure must be permanent. The whole industry is vitally interested that bad conditions, which have a contagious quality, do not spread again.

Those who are responsible for finding the solution in present points of trouble will best serve the industry and themselves by being sure that the solution is equitable and just. Their obligation extends beyond the areas of present trouble.—*Electric Railway Journal.*

Despite the more complete appreciation of the problems of the electric railways by the people whom they serve, their opinions are influenced by these few sore spots. Until they are healed, money for new lines and much needed extensions will come very slowly.

It behooves everyone whose interests lie in the industry to cooperate to the limit in the cure and in the education of the public as a whole.

Our series "how individual lubricating service reduces lubricating costs," interrupted for the publication of this advertisement, will be continued next week.

WRITE FOR OUR BOOKLET

The Universal Lubricating Co.

Cleveland, Ohio

Factory: Sweeney Ave. Office: Schofield Bldg.

TULC+Universal Service

The Dawn of a New Day

The most discouraging period for the electric railway industry has undoubtedly passed, and a new day is dawning. Electric railway men who have fought the fight faithfully are seeing victory ahead and better and bigger business than ever before.

We know something about this. The Ohmer System of fare protection came into its own when expenses had to be cut and everything done to conserve the income. When many things formerly considered necessary had to be eliminated, the Ohmer System stuck.



The result is that the demand for Ohmer fare registers is now much greater than ever before in our history.

Our plan of bearing the investment burden of the register installation and its maintenance, the flexibility of our contracts, and above all the thoroughly proven value of the Ohmer System in cultivating intensively every possible means of safeguarding and increasing the revenue have made the Ohmer System standard and necessary for all kinds of electric railway service.

You take no risk when you adopt the Ohmer System. We cannot afford to let you be disappointed. Tell us something about your fare protecting difficulties. We shall be glad to help you, even if you decide not to do business with us.

Ohmer Fare Register Company

Dayton, Ohio

H-B LIFE GUARDS

are specified for

SAFETY CARS IN PHILADELPHIA





The Transit Companies of Philadelphia, realizing that the successful advent of the Safety Car depended largely on the accomplishment of its primary object, Safety, specified H-B Life Guards.

The H-B Life Guards act instantaneously, preventing the body of the fallen pedestrian from coming in contact with the wheels.

The proof, by the use of H-B Life Guards on these cars, that they are truly Safety Cars, makes Philadelphia a satisfied city of Safety.

H-B Life Guards

Not An Attachment But An Essential

The Consolidated Car Fender Co., Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co., 61 Broadway, N. Y.

. . . . . and then what happens?

The Electric Railway extends its lines into new territory.

Then what?

First, a lot of people who have been walking half a mile to get a car to take them to work now pick it up at their door. What is that service worth?

New home building always follow an electric railway extension. How does that effect the "common people?" Well, Jones is a contractor. He's interested in home building. Brown is a lumber dealer. He likes to see new homes going up. Smith is a butcher; White is a grocer. They like to see these homes under way because it means additional families to buy their products. And so on.

They're *all* vitally interested in Electric Railway development but *most of them don't know it.*

So it's up to us to tell them—carry the message to every individual of the public. When we do that the Electric Railway and every electrical man in the country will enjoy increased prosperity.

More-Jones Brass & Metal Co.

St. Louis **Missouri**

"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Geared Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs



"The 'Standard' Brand on your material is an assurance of eventual economy."



STANDARD STEEL WORKS CO.

GENERAL OFFICES:

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA

RICHMOND
SAN FRANCISCO
NEW YORK
MONTEREY, MEX.

MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

NIM

The nim tree is sacred to the Hindu.

Few dare to speak lies under its shadow.

A jealous husband instead of planting a Pinkerton simply throws his nim branch into the ring.

If, in answering questions the wife touches the nim branch, then her answers are truthful.

If she dares not touch it, then the awful—(but let's get back to simpler elements)—

The big idea is that the nim branch is a thing that makes people tell the truth.

Men, if brush users could only use a thing like that on cheap carbon brush salesmen when they call, there would be much more efficiency in power houses—for Morganite only could truthfully answer the questions that operators ask.



Morganite Brush Co., Inc.

Main Office and Factory: 519 West 38th St., New York

DISTRICT AGENTS:

Lewis & Roth, 13th and Wood Sts., Philadelphia

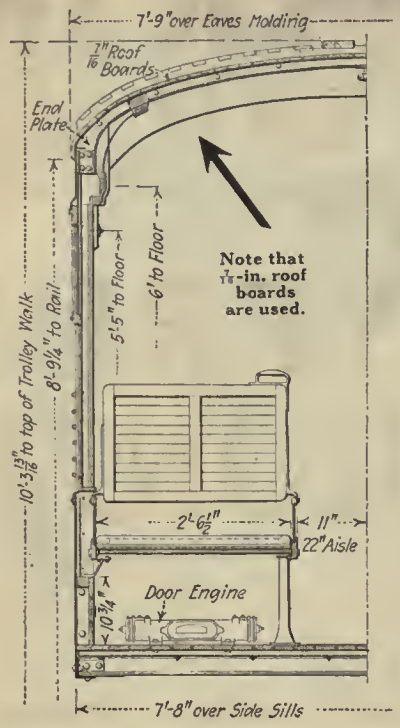
Electrical Engineering & Mfg. Co., First National Bank Bldg., Pittsburgh

W. R. Hendrey Co., Hodge Bldg., Seattle

Herzog Electric & Engineering Co., 150 Steuart St., San Francisco

Charles Farnham, I. W. Hellman Bldg., Los Angeles

Railway & Power Engineering Corporation, Ltd., 131 Eastern Ave., Toronto, Ontario, Canada



Osgood Bradley Safety Cars Have Stronger Roofs

No matter how small your cars may be, you must have a roof strong enough to withstand the occasional slap of a wild trolley pole and the weight of the burliest shopman.

With these upkeep and safety points in mind, we concluded that the roof boards should be 7/16-in. thick instead of 5/16-in. thin. They are of the usual tongued and grooved whiteboard covered with No. 8 duck.

Nor is this all. The roof entire is built up on jig so that everything which goes into it is absolutely interchangeable. Riveted connection plates secure it to the side frames which are also jig-built. There is no chance for weaving of the superstructure, because the 1/8-in body end plates of 18-in. depth riveted to the side frames at the body corner posts give the top of the car the lateral stiffness required to avoid this sort of trouble.

In the Standard Osgood Bradley Safety Car, the carlines and lower side of the roof boards are exposed. But, of course, you can specify any kind of headlining you care to buy, and that your decorative standards and climatic conditions may demand.

Builders of City and Interurban Cars

OSGOOD BRADLEY CAR COMPANY

Builders to Two Generations of Electric Railway Men

WORCESTER, MASS.

THERE ARE THREE VALUES FOR RAILWAY COMPANIES IN THE SPECIFICATION and USE OF

CYPRESS

"THE WOOD ETERNAL"

for Crossarms, Car Material, Fencing, Station Construction and similar railway purposes:

First, the vastly longer life of the material itself. *All-Heart Cypress* is pretty nearly *proof* against the action of decay.

Second, the

SAVINGS OF LABOR COSTS IN YOUR MAINTENANCE WORK

Obviously the longer the serviceable life of the lumber you use, the less you are going to have to repair and replace. That of course means not merely saving in cost of material, but also saving in the much bigger item—*cost of labor.*

Third, when you specify Cypress you can know *definitely* that you get what you pay for IF you see THIS MARK: This mark is on the ends of every piece of Cypress cut by the responsible mills in this Association. It is a guarantee that the material bearing it is made, *and graded at the mill,* in accordance with the scrupulously high standards demanded by this Association and the best customers of its members.

These *values* are worth *getting.* The *facts* are worth *remembering.*

Our data are at your service

SOUTHERN CYPRESS MFRS'. ASS'N

1265 Hibernia Bank Building, New Orleans, La., or
1265 Heard National Bank Building, Jacksonville, Fla.



CYPRUS BRONZE

The Brady Brass Company is the original manufacturer of the soft bearing metal known as Cyprus Bronze, which is now being used in almost every country of the world for

Engine Castings, Railway Journal Bearings and High Speed Motor Bearings

It is more generally known as M. C. B. Grade "A" Specification.

The original formula was developed by this company after a railroad experience of more than two score years, and from an economic standpoint—high in lead and low in tin contents—continues to meet with great favor.

Today we are selling Cyprus Bronze metals, M. C. B. Grade "A" Specification, wherever railways are operating. This has been made possible by the building up of a splendid organization of trained men, located in an up-to-date plant at tidewater of such a capacity as to insure prompt deliveries anywhere.

We respectfully solicit your inquiries

BRADY BRASS COMPANY

General Office and Works:
170-182 Fourteenth St., 169-175 Fifteenth St.
Jersey City, N. J.
95 Liberty Street, New York City



Motor-Generator Sets for all Classes of Service

In Any Capacity *Built to Meet Any Requirement*

ALLIS-CHALMERS MANUFACTURING CO.

Complete Power and Electrical Equipment

District Offices in All Large Cities

Milwaukee, Wisconsin

Globe

Tickets and Transfers

We have manufactured tickets exclusively for nearly forty years and are constantly designing new forms to efficiently care for all present-day operating conditions.

The tickets and holders used by the Connecticut Company, in connection with their Zone Fare System, are "GLOBE" products.

Globe Ticket Company

112-114 North 12th Street

Philadelphia, Pa.

New York Office
160 West 14th Street

Among our many specialties we call particular attention to the P. M. Coupon Transfer and Reduced Rate Tickets of all kinds.

May we send you samples of the forms best suited to your requirements?

"Noark" renewable and non-renewable cartridge enclosed fuses, in all standard capacities, are approved by the Underwriter's Laboratories, Inc., under the label service.



Your experience has made our reputation

We believe that the reputation of a product must grow, not where that product is made, but in the thousands of places where it is sold or used.

So it is not necessary to claim that "Noark" Fuses stand high in the world of fuse protection—but merely to point to the kind of concerns who have used them consistently for twenty years.

H. W. JOHNS-MANVILLE CO., New York City
10 Factories—Branches in 64 Large Cities
For Canada, Canadian Johns-Manville Co., Ltd., Toronto



Manufactured by Johns-Pratt Co., Hartford, Conn.

H. W. Johns-Manville Co. Sole Selling Agents

Through—
Asbestos
and its allied products
JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS-MANVILLE
ELECTRICAL MATERIALS



J-P Co. REG. IN U.S. NOARK PAT. OFF. FUSE

Practical Armature Winding

Save Time— Worry— Energy



You are called to repair a motor or generator. The trouble is there, but how to find and fix it is up to you. That's when you need this new and accurate guide on

Armature Winding AND Motor Repair

By D. H. BRAYMER

500 *pages, 6 x 9, illustrated,* $3.00 *net, postpaid.*

Don't limit yourself by your own experience. Here is a compilation of practical methods that are in present use by repairmen and armature winders on every kind of job. Common-sense data, not a theoretical discussion of armature winding design. Only such material which describes in detail the methods found by actual experience to represent the best repair shop practice has been included in this new handbook. It's the "how-to-do-it" book for your daily use.

Try these helpful kinks on the job

Save time, worry, and energy for ten days free, and then decide whether or not you want to keep the book. Send the free examination coupon now.

MAIL THIS COUPON TODAY

McGraw-Hill Book Co., Inc.,
239 West 39th Street, New York, N. Y.

You may send me on 10 days' approval Braymer's Armature Winding and Motor Repair, $3.00 net, postpaid. I agree to pay for the book or return it postpaid within 10 days of receipt.

Regular subscriber to the Electric Railway Journal?.....

Member of A. I. E. E.?.....

Signed.....

Address.....

Name of Company.....

Official Position.....

(Books sent on approval to retail customers in the U. S. and Canada only.) E-7-10-20

High Speed!



10 Seconds



FORGING AHEAD!

City and Interurban Electric Railways today are the veins of our towns and villages, great and small.

We submit for the consideration of operator, manufacturer and citizen the subject of development in this most vital industry.

Today a large majority of the Electric Lines are on a sound financial basis. One year ago the majority were not sound financially.

The improvement must be more than apparent to everyone. But the industry needs not only the co-operation of the public but yours as well—not only the co-operation of your company, but yours individually.

Consider the improvement since July, 1919, and let your thought and speech reflect the change.

Consider also that such straight thinking and talking will benefit yourself as well as benefiting your company and the city in which you live.

BAYONET TROLLEY HARP CO., Springfield, Ohio, U. S. A.

Just Suppose---

That along with all the other hard knocks of the past few years-
We hadn't developed the safety car.
We hadn't received ANY fare increases.
The public and public officials were still of unfair attitude.
We hadn't learned all these new things about merchandising street car rides and cutting costs.
Then conditions really would be bad. They're bad enough as they are, but the past few years have seen long strides ahead for the industry. Above all we learn that for every obstacle there is a way around. There is no place for fear of the industry's future, but there is great opportunity for courage and work.

St. Louis Car Company

St. Louis, Mo.

1870 - EUGENE F. PHILLIPS - AMERICAN ELECTRICAL WORKS - 1882

WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
(Single, Duplex and Three Phase)
TROLLEY WIRE
(Round, Grooved or Figure 8)
BARE COPPER WIRES AND CABLES
MAGNET WIRE
(Cotton or Asbestos)

Americanite Rubber Covered Wire
Incandescent Lamp Cord
Galvanized Iron and Steel Wire and Strand

AMERICAN ELECTRICAL WORKS
Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

THE LINDSLEY BROTHERS CO.
Western "Good Poles Quick" Northern

Quick Shipments from our Minneapolis Yard
Rooms 832-834, 72 W. Adams St. CHICAGO, ILL.
Spokane—St. Louis
Butt Treating Open Tank and "Hot and Cold" Processes

Peirce Forged Steel Pins with Drawn Sheet Steel Thimbles
Your best insurance against insulator breakage
Hubbard & Company
PITTSBURGH, PA.

Chapman Automatic Signals
Charles N. Wood Co., Boston



EUREKA PRODUCTS
Cummutators, Trolley Wheels, Sleet Trolley Wheels, Trolley Ears, Line Material, Controller Fingers, Brush Holders, etc.
We make quality goods.
THE EUREKA COMPANY, North East, Pa.

ROEBLING Trolley Wire
INSULATED WIRES AND CABLES
WELDING WIRE WIRE STRAND
JOHN A. ROEBLING'S SONS CO., TRENTON, NEW JERSEY

ARISTOS COPPERWELD
A Copper Conductor with the Strength of Steel.

Trolley Wire
Copperweld Wire is 60% stronger than solid copper wire, is 7% to 10% lighter, costs less per pound, lasts 3 to 4 times longer, and therefore is ideal for electric railway service. Write for catalogue No. 22.
COPPER CLAD STEEL COMPANY
OFFICE AND WORKS, RANKIN, PA. NEW YORK CITY OFFICE 30 CHURCH ST.
WESTERN SALES REPRESENTATIVES. STEEL SALES CORPORATION, CHICAGO, ILL.

STEEL POLES FOR EVERY POLE PURPOSE

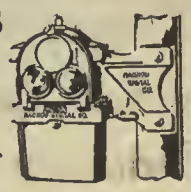


Cut shows Bates Steel Poles in use by the Royal Swedish States Rys., electrifying the steam railroads of Sweden, Lapland, located about 75 miles north of the Arctic Circle, in the land of the Midnight Sun, the most northerly railroad of the world.
Bates Steel Poles are becoming universally popular world wide. Repeat orders testify their general suitability for every Pole purpose.
Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, Etc.
Highest class and most up-to-date steel pole equipment in the world.
Our STEEL POLE TREATISE tells the story. Ask for it.
About 2,000 tons of steel constantly on hand; hence prompt shipments.
Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to verify these facts.
BATES EXPANDED STEEL TRUSS COMPANY
208 LaSalle Street Chicago, Ill., U. S. A.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG.
ARCHBOLD-BRADY CO.
Engineers & Contractors SYRACUSE, N. Y.

AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
Albert & J. M. Anderson Mfg. Co.
289-93 A Street, Boston, Mass.
Established 1877
Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.
London, 48 Milton Street

AUTOMATIC SIGNALS
for Electric Railways
Highway Crossing Bells
Headway Recorders
NACHOD SIGNAL COMPANY, Inc.
LOUISVILLE, KY.



U. S. ELECTRIC SIGNAL CO. WEST NEWTON, MASS.
U. S. Electric Contact Signals
for
Single-track block-signal protection
Double-track spacing and clearance signals
Protection at intersections with wyes
Proceed signals in street reconstruction work
United States Electric Signal Co.
West Newton, Mass.

American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

Send for new Rail Bond book

American Steel & Wire Company
CHICAGO
NEW YORK

SPECIAL TRACK WORK

For Electric and Steam Railroads, in all types of construction
Converter and Electric Steel Castings
Hammer and Press Forgings
Seamless Steel Gas Cylinders

WM. WHARTON JR. & CO. INCORP.
EASTON, PA.
Subsidiary of Taylor-Wharton Iron & Steel Co.
High Bridge, N. J.

OTHER PLANTS:
Philadelphia Roll & Machine Co., Philadelphia.
Tioga Steel & Iron Co., Philadelphia.

ORIGINATORS OF MANGANESE STEEL TRACK WORK

Dependable Track Work for Electric Railways

ST. LOUIS FROG & SWITCH CO. ST. LOUIS, MO.

Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

ST. LOUIS FROG & SWITCH CO.
ST. LOUIS, MO.

BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

HIGHEST QUALITY

TRACK SPECIAL WORK

HIGHEST QUALITY — FROGS — CROSSINGS — SWITCHES — STANDS — SAFETY — DURABILITY — F & C Co.

WE MAKE THIS GRADE ONLY

CLEVELAND FROG & CROSSING CO.
CLEVELAND, OHIO

HIGH-GRADE TRACK WORK

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
Hoboken, N. J.

Insure Your Power House with a

CASTLE LIBERTY No. 1



Inaurance policies *do not* put out firea. They only pay for the damage done by the fire. The delay caused by having to rebuild or repair damage done by fire often coata more than the Inaurance Company pays. Avoid thia delay by equipping your Power House with the *New Exclusive* CASTLE LIBERTY No. 1, a Three-Gallon Carbon Tetrachloride Type, Hand Pump Fire Extinguisher which has aufficient capacity to extinguiah almost any fire apt to happen around the Power House.

Comparative and competitive testa have proved that a CASTLE LIBERTY No. 1 can extinguiah fire that could not be controlled by twenty-eight one-quart fire extinguishers.

The extinguishing agent is Castle Liquid, approved for Government use and used by leading Corporations, Railroads and Governmental Departments.

Write for complete description. Write for "Safety Always" telling the real story of fire extinguishing liquids.

James M. Castle Inc.
812 Lincoln Bldg.
Philadelphia, Pa.

Manufacturers and Distributors of Fire-Extinguishing Apparatus

DIFFERENTIAL

UTILITY CARS

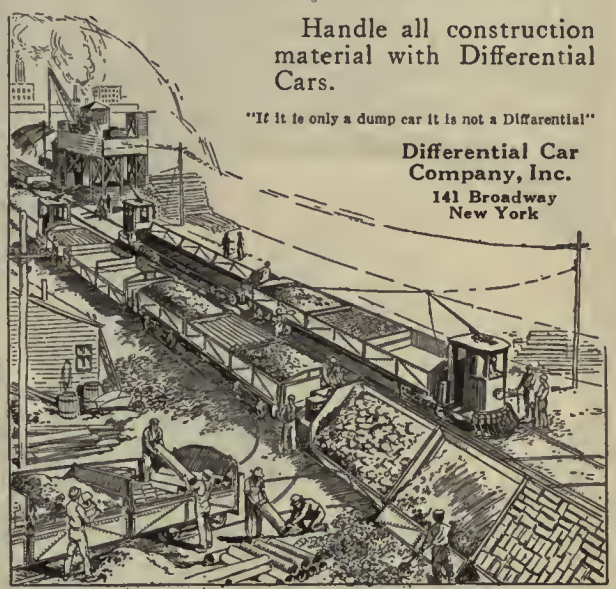
Electric Railways!

SAVE MONEY!

Handle all construction material with Differential Cars.

"If it is only a dump car it is not a Differential"

Differential Car Company, Inc.
141 Broadway
New York



The Babcock & Wilcox Company

85 Liberty Street, New York

WATER TUBE STEAM BOILERS

Steam Superheaters — Mechanical Stokers

Works: BARBERTON, OHIO—BAYONNE, N. J.

BRANCH OFFICES:

ATLANTA, Candler Building
BOSTON, 49 Federal St.
CHICAGO, Marquette Building
CINCINNATI, Traction Building
CLEVELAND, Guardian Building
DENVER, 435 Seventeenth St.
HAVANA, CUBA, Calle de Aguiar 104
HOUSTON, TEXAS, Southern Pacific Bldg.
LOS ANGELES, I. N. Van Nuys Bldg.
NEW ORLEANS, 533 Baronne St.
PHILADELPHIA, North American Bldg.
PITTSBURGH, Farmers' Deposit Bank Bldg.
SALT LAKE CITY, 705-6 Kearns Bldg.
SAN FRANCISCO, Sheldon Bldg.
SAN JUAN, Porto Rico, Royal Bank Bldg.
SEATTLE, L. C. Smith Bldg., Rooms 1914-1917
TUCSON, ARIZONA, Santa Rita Hotel Bldg.

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all i s branches

Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. **111 Broadway, New York**

LACKAWANNA AIDS TO BETTER TRACK

See our double-page advertisement in last week's and next week's issues and send for booklets. "Lackawanna Deseamed Rails," "Improved Track Appliances," and "Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.
Atlanta Buffalo Cincinnati Detroit Philadelphia San Francisco
Boston Chicago Cleveland New York St. Louis
Sole Exporter of Our Commercial Products, Consolidated Steel Corp., New York

RAMAPO

Automatic Safety and Automatic Return Switch Stands for Pasaing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

Ramapo Iron Works
HILLBURN, NEW YORK
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

MILWAUKEE OIL STORAGE SYSTEMS

SELF-MEASURING PUMPS
KANT-LEEK OIL TANKS
with
UNDERWRITER'S LABELS

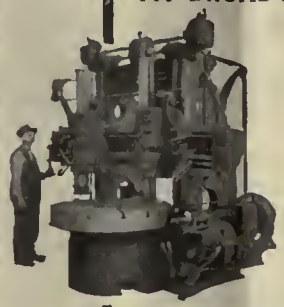
CAR JOURNAL WASTE SATURATING OUTFITS

SEND FOR SPECIAL RAILWAY EQUIPMENT · CATALOG



MILWAUKEE TANK WORKS
MILWAUKEE, U.S.A.

NILES-BEMENT-POND CO.
111 BROADWAY, NEW YORK



MACHINE TOOLS

FOR ELECTRIC RAILWAYS

Axle Lathes
Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
Cranes
General Machine Tools

TOLEDO CRANES

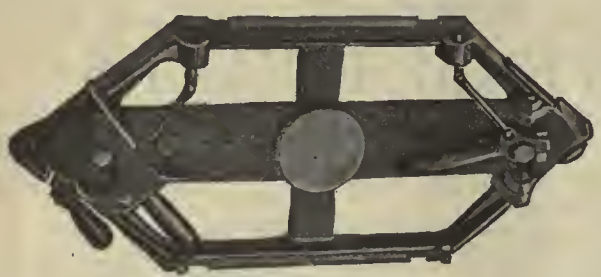
Meet Every Requirement.



TOLEDO BRIDGE & CRANE CO.
TOLEDO, OHIO

New York Office, 52 Broadway — Cleveland Office, 728 Citizens Bldg.
Philadelphia Office, 2013 Market St. — Chicago Office, 549 Washington Blvd.
Pittsburgh Office, 203 Oliver Bldg. — San Francisco Office, Rialto Bldg.

Work Made Easier By Using Comstock Electrical Appliances



Field Coil Forms

Diamond Manufacturing Co., Wyoming, Pa.

Field Coil Forms
Armature Coil Forms
Coil Presses
Forming Machines
Pulling Machines
Armature and Field Coil Winding Machines



Winding Machine → Face Plate in winding machine can be used either in perpendicular or horizontal position

SPECIFY

THE TERRY TURBINE

For Driving Your Auxiliaries

TERRY STEAM TURBINE CO.
Hartford, Conn

GREEN CHAIN GRATES

Green Sealflex Arch
Green Pressure Water Back
Green Steam Jet Ash Conveyor
Green Materials Transfer and Storage Bunker

GREEN ENGINEERING CO. East Chicago, Ind.

THE CUTTER ELECTRICAL AND MANUFACTURING CO. CIRCUIT I-T-E BREAKERS PHILADELPHIA

I. T. E.
Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

The SCOOP CONVEYOR

Over 2000 Users



For Storing and Reclaiming, Loading and Unloading Cars, Trucks and Wagons. Does the work of from 6 to 12 men and keeps equipment moving Write for Literature.

Portable Machinery Co.
Passaic, N. J.



Williams' "Vulcan" Drop-Forged Safety Lathe Dogs

WE have an unusually good strain of dogs. Demands of high-speed cutting have been consistently met. Dogs with bent tails; Dogs with straight tails; Dogs with flat tails; Dogs with one screw; Dogs with two screws—all with same unsurpassed merit and strength.

Sixteen sizes—$\frac{3}{8}$ to 6-inch capacities. *Machinists' Tools Booklet on request.*

J. H. Williams & Co.

"The Drop-Forging People"

Brooklyn—Buffalo—Chicago

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.

VENTILATORS Also Ventilate in Stormy Weather.

THERMOSTATS Save Current.

ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.

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LET US FIGURE ON YOUR NEXT REQUIREMENTS

Gold Car Heating & Lighting Co., 17 Battery Pl., New York



The Cleveland has no intricate mechanism to get out of order—this eliminates annoying "pull-ins" due to fare box being out of order. Has only three working parts and they are of manganese bronze.

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.

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SAFETY BUSH TOOLS

BUSH SAFETY TOOLS

Make HOT WIRE WORK SAFE AND SURE

Write for Bull. No. A

THE BUSH ELECTRIC CO.

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"UNION" FUSES

"Union" Renewable Fuses will save four-fifths of your fuse maintenance cost. Guaranteed to give satisfaction. Money back if they fail. Booklet on request.

CHICAGO FUSE MFG. CO.
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"Everything in Insulation"

Mica	Waxes
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The above are only a few of our products
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A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.

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International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

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The "Hycap-Exide" Battery
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STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
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BAKELITE-DILECTO
The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods.
The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.
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We can help you
Write to
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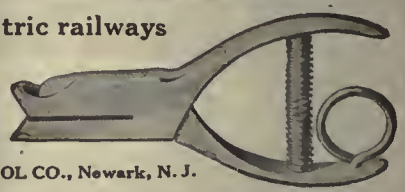
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Established 1892
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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost
The Cooper Heater Company
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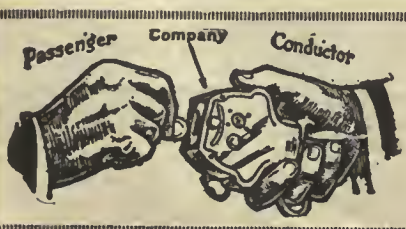
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Controller Fingers
which last for years. The tips are renewable and reversible
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B-V Punches
Send for Catalog.
BONNEY-VEHSLAGE TOOL CO., Newark, N. J.



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Eliminate Accidents
Send for Catalogue No. 18
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Direct Automatic Registration By the Passenger
Rooke Automatic Register Co.
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—a manufacturer
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—saved $200
buying from an Indiana dealer in
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It pays
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0058

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



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The efficient little Quick Service Car is surely a much-talked-about vehicle. Why? Because it hits the spot.

There is a great demand for Nuttall Helical Railway Gearing for the Quick Service Car.

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"Boyerized" Products Reduce Maintenance

Bemis Trucks	Manganese Brake Heads
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Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

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City and Interurban Cars and Trucks, Snow Sweepers and Plows,

Express, Combination and Work Cars, Electric Locomotives

Sell—Exchange—Rent

Some one is probably looking for those items you want to sell. The same person may have just the things you want to buy.

Let the Searchlight help YOU

53



DAVIS STEEL WHEELS.
Standard for Electric Railway Service
AMERICAN STEEL FOUNDRIES
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Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
Faster than the ticket seller
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STUCKI SIDE BEARINGS
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SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

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1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
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EMPLOYMENT

POSITIONS VACANT

POSITIONS WANTED

POSITIONS VACANT

CHIEF clerk, experienced in street railway and electric light accounting. Gross business about $300,000, and 2500 customers. Give age, experience, salary expected and reference. P-642, Elec. Ry. Journal.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West. State experience, references, and salary desired when replying. P-605, Elec Ry. Journal, Old Colony Bldg., Chicago.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

FOREMAN wanted, for car house handling inspection and running repairs on 20 suburban and 25 city cars. P-685, Elec. Ry. Journ., Leader News Bldg., Cleveland.

MASTER mechanic for New England road operating 65 cars. Must be able to show results. State experience, age, previous responsibility and salary expected. P-693, Elec. Ry. Journal.

PERMANENT position for an experienced track Supervisor on one of the large trolley systems in the East. Must be capable of handling 18 to 20 track, bonding, welding and paving ganga. Only men thoroughly familiar with trolley track construction and maintenance will be considered. State age, giving experience in detail, salary expected and references. P-682, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

SUPERINTENDENT on road operating 70 cars in Massachusetts. Must be good at traffic and labor problems and an efficient operator. Technical training desirable. State age, experience and salary expected. P-692, Elec. Ry. Journal.

TIME table maker assistant, able, ambitious, experienced. State qualifications, experience and salary expected. Chicago Surface Lines, 804 Borland Bldg., Chicago.

TRACK supervisor or roadmaster. Permanent position for an experienced man. Southern city, population 50,000; must be capable of handling bonding, welding, paving, bridge and general track work; only men with previous electric railway experience will be considered; state age, experience, salary expected and references. Address P-695, Electric Railway Journal, 935 Real Estate Trust Bldg., Philadelphia.

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
533 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendations or other papers of value should not be enclosed to unknown correspondents — send copies.

POSITIONS WANTED

ARMATURE winder or controller man desires position; four years' experience in railway work. PW-680, Elec. Ry. Journ., Real Estate Trust Bldg., Phila.

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CLAIM agent 40 years old, active and full of life, long experience, desires to make change; expert shorthand writer, obtaining most thorough information investigating accidents, from both injured and witnesses; motormen and conductors most carefully instructed; fine record on low settlements; take own photos of accidents; thorough and up-to-date office system installed; excellent references. PW-694, Elec. Ry. Journal.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

MASTER mechanic, 17 years' experience in all departments, city and interurban, M. K. and H. L. control; can handle labor and show results; A-1 reference furnished. PW-690, Elec. Ry. Journ., Leader-News Bldg., Cleveland.

ROADMASTER, nineteen years on trolley roads. Can handle any track proposition. Now employed as roadmaster. References good. PW-691, Elec. Ry. Journal.

POSITIONS WANTED

SUPERINTENDENT, 17 years' experience in transportation, traffic and mechanical, on road operating in eastern Ohio. A-1 references, executive ability, competent to assume full charge; can get results. Address PW-639, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT. Fully qualified in all departments; many years' experience in single track, high-speed, and city operation. Successful in handling labor and maintaining discipline. Now employed but desirous of bettering prospects. Requests the attention of presidents or managers having vacancies or contemplating changes. Excellent references from past and present employers. PW-638, Elec. Ry. Journal.

THOROUGHLY competent operating executive, now manager of small property, desires an opportunity to assume greater responsibilities, with better prospects for the future. Fully qualified in all departments. Most excellent references from present and past employers. Correspondence solicited. PW-637, Elec. Ry. Journal.

WANTED

Volumes

Complete set of Electric Railway Journals for 1917 wanted. Newport News & Hampton Ry., Gas & Elec. Co., Hampton, Va.

FOR SALE

Motors

Sixteen GE 57 street railway motors for sale; armatures are two-turn, without pinions; overhauled and in first-class condition; make offer for all or part. FS-696, Elec. Ry. Journal.

FOR SALE—3000 tons 67 lb. strictly first-class

RELAYING RAIL

with Angle Bars.

Location—Toledo, Ohio District.

Also

OTHER WEIGHT RAILS— NEW AND RELAYING

Fuller Steel & Iron Company

Park Building, Pittsburgh, Pa.

NEW
80 lb. RAIL & ACCESSORIES

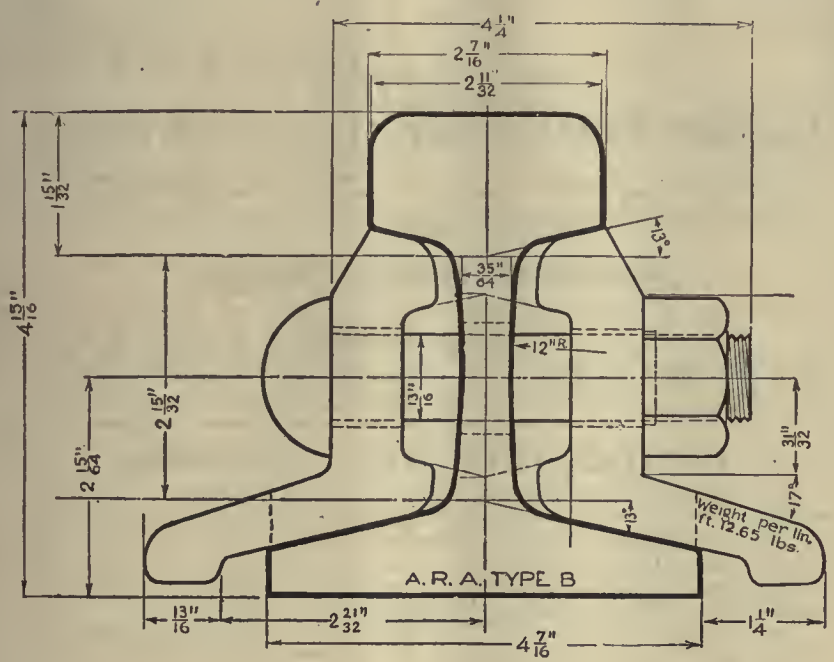
ANGLE BARS, SPIKES, BOLTS AND NUTS COMPLETE

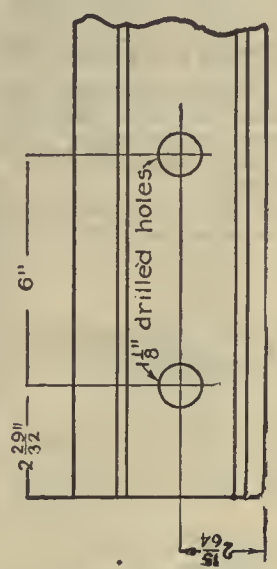
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A.R.A. "TYPE B" RAIL

Approximately 50,000 gross tons—drilled—standard lengths

Stored at Norfolk, Va. and Kearney, N. J.





Note actual dimensions of rail stated hereon.

HYMAN-MICHAELS COMPANY

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New York Office
1324-1326 Woolworth Building

Pittsburgh Office
1312 First National Bank Building

St. Louis Office
2115 Railway Exchange Building

New—Used—Rebuilt
MACHINERY AND SUPPLIES
for construction and industrial work.
READING ENGINEERING CO., INC.
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ATTENTION

Having just purchased from the United Ststes Government, can offer you the following trsck msterial at very exceptional prices:
75,000 Tie Plates, 6½ x 10, for 80-lb. rail.
150,000 Pieces of Rail Braces for same type rail.
25,000 Pair Angle Bars, 80-lb. rail drilling 6 x 6 x 6.
The above msterial located at Norfolk, Va.; Kearny, N. J., and Chicago, Ill. A new, first quality steel, ready for immediate shipment.
Also large tonnage of steel rails of most all sections.

M. K. FRANK
Frick Bldg., Pittsburgh, Pa.

STREET CARS

3—32-ft., 4-ft. 8½-in. ga. closed motor cars; seating capacity 32, Symington-Baldwin trucks. First Class. Will convert to one man operation if desired.
4—22-ft., 4-ft. 8½-in. ga., open trailers; seating capacity 35. Taylor McGuire trucks. Good.

ZELNICKER IN ST. LOUIS

For a list of hundreds of other unusual bargains in Rails, Railway and Industrial Machinery and Equipment write for Our Latest General Bulletin.

FOR SALE
5—400 hp.
Hazelton Porcupine Boilers
for 150 lb. steam pressure, complete with Murphy stokers, Squires feed water regulator, used five years, all in good working order.
United Electric Light Co.
Springfield, Mass.

FOR SALE
3—50 foot.
Center Entrance Steel Interurban Cars
Standard C 55 P Trucks
4 Westinghouse 306 CA Motors
H L Control and
7—43 foot.
Single End Wood Interurban Cars
Brill 27 E Trucks
4 G.E. 57 Motors
K Control
Immediate Shipment
Washington-Virginia Railway Company
1202 Pennsylvania Ave., N. W.,
Washington, D. C.

Caution—RAIL USERS

BUY NOW. There is a SCARCITY. We offer the following NEW RAILS for prompt shipment:

New 12-lb. and 30-lb. rails, splices, bolts and nuts.
New 90-lb. rails, angle bars, bolts, nuts and spikes.

They will be gone soon. Write or wire for our quotations.

Wire—300,000 lb. or more of copper trolley, feeder, high tension, etc.

A number of steel bridges on line of Cincinnati & Columbus Traction Co. For quick acceptance at $1.00 per 100 lb. as is. Photographs on request.

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BRANCH OFFICES: First National Bank Bldg., Pittsburgh, Pa.; Railway Exchange Bldg., St. Louis, Mo.; East Chicago, Ind.; New York: Woolworth Bldg.
YARDS AND WAREHOUSES: East Chicago, Ind. and St. Louis, Mo.

IMMEDIATE DELIVERY

Twenty-Five Cycle Rotary Converters

2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltsge 13,200, secondsry 380-volts.
1—250-kw., 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltsge 13,200, secondary 380 volts.

Street Railway Motors

20—G.E. 800-volts with Form K Controllers.
All in Splendid Condition

JOSEPH MEYERSON, 411 Atlantic Ave., Boston 9, Mass.

LONDON COUNTY COUNCIL

The London County Council invites engineers and others possessing the requisite technical knowledge to submit designs for a new type of electric tramcar for use on its tramways.

The competition will be open to persons of any nationality and whether resident in Great Britain or not. No person in the service of the Council will be eligible to compete.

The designs will be assessed by Mr. A. L. C. Fell, General Manager of the Council's Tramways, and an engineer nominated by the President of the Institution of Civil Engineers.

The conditions of competition provide for the award of a prize of £1,000 to the competitor who sends in the design which it is decided by the assessors is the best of those submitted and which complies with such conditions.

The designs accompanied by the necessary reports, specifications etc., must be delivered at the competitor's own expense not earlier than 1st November and not later than 4 p.m. on

Tuesday, 30th November, 1920.

Applications for conditions, plans, etc., relating to the competition should be addressed to the General Manager, London County Council Tramways, No. 23, Belvedere Road, London, S.E.1.

Competitors, on payment of a sum of 2 guineas, will be furnished with a general drawing of the type of car at present in general use on the London tramway system accompanied by the more important particulars relating thereto. This amount will be returned to each competitor who submits a *bona fide* design and does not subsequently withdraw the same and also to any person who, on receipt of the conditions, etc., decides not to compete and returns the copy of the drawing, etc., referred to above, within two weeks.

JAMES BIRD
Clerk of the London County Council

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

FREQUENCY CHANGER SETS

1—600 kva., Allis-Chalmers Frequency Changer Set, 300 r.p.m., 3-phase, 60-cycle, 2300-v. one end, 3-phase, 6600-v., 25-cycle on other end.
1—400 kw., G. E., 3-phase, 25-cycle, 6000-v. one side—2400-v., 2-phase, 60-cycle other side—375 r.p.m.

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Advertisements for the

Searchlight Section



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Thursday

For Issue out Saturday

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RAILS IN STOCK

IMMEDIATE SHIPMENT

GUARANTEED

10,000 Tons New 12-lb. to 100-lb., and fastenings.
40,000 Tons New Open-hearth, first quality, 80 lb.
5,000 Tons Relayers, 25 to 100 lb., and fastenings.
Car and less carload inquiries and orders solicited.
Rails cut to lengths for all purposes.

TRACK ACCESSORIES
BOLTS, NUTS AND SPIKES

We Manufacture

FROGS, SWITCHES, CROSSINGS, PORTABLE TRACK, DUMP CARS, PLATFORM CARS, ETC.

L. B. FOSTER COMPANY

Park Building
Pittsburgh, Pa.

Tribune Building, 154 Nassau St.
New York, N. Y.

FOR SALE—*IMMEDIATE DELIVERY*

TRANSFORMERS

Used for a short time at Camp Stuart, Newport News, Va., are in excellent condition and will be furnished with hangers.

WESTINGHOUSE "TYPE P"

Kva.	Ht.	Lt.	Cycle
1	2200	110-220	50-140
5	2200	110-220	60
7½	2200	110-220	50-140
10	2200	110-220	60
15	2200	110-220	60

PITTSBURGH

2	2200	110-220	60
5	2200	110-220	50-133
15	2200	110-220	50-133
15	2200	110-220	60
20	2200	110-220	60
25	2200	110-220	60
375	22,000-11,000	2300	60
400	22,000-11,000	2300	60

"GEN. ELEC." CONSTANT CUR. Type "RO"

			Amp.
4	2300	60	6.6
8	2300	60	6.6

"PACKARD" TYPE "A"
3-k., 60-Cycle, P.V. 3300, Amp. 6.6.
Transformer, 1674 Adjuster Coil, A.W., 1674

15	3300	115-230	60
100	2200	110-220	60

"GENERAL ELECTRIC" TYPE "H"

Kva.	Ht.	Lt.	Cycle
5	2200	110-220	60
7½	2200	110-220	60
10	2200	110-220	60
15	2200	110-220	60
20	2200	110-220	60
25	2200	110-220	60
2	3300	122-244	60
7½	3300	122-244	60
10	3300	122-244	60
10	1560-3120	115-230	60
15	3300	122-244	60
25	3300	122-244	60
30	3300	122-244	60
37½	1560-3120	115-230	60

"MOLONEY" TYPE "HE"

2	3300	110-220	60
7½	3300	110-220	60
7½	1150-2300	115-230	60
15	1150-2200	110-220	60
15	1150-2300	115-230	60
15	1650-3300	115-230	60
15	1650-3300	120-240	60
20	4000	110-220	60

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15	2200	110-220	60

Also the Following ELECTRICAL MATERIALS in Large Quantities

Adjusters	Brace Arms	Cutter Boxes	Clamps	Cutouts	Switches
Arresters	Brackets	Condulets	Fixtures	Plugs	Wire
Break Arms	Bolts	Lamp Cord	Insulators	Sockets	Poles
Bases	Cross Arms	Cleats	Lamps		

Write for detailed list and prices

ATLANTIC SALVAGE CO., Newport News, Va.

FOR SALE

6—50-FT.

Interurban Cars

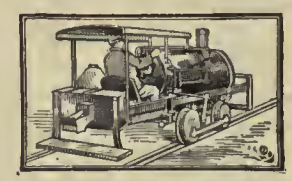
Complete

Mounted on Standard C-60-P Trucks; 4 West. No. 56 Motors.

Electric Equipment Co.
Philadelphia, Pa.

FOR SALE

TWO BELL LOCOMOTIVES
7 - TON - OIL BURNING



First-Class Condition Immediate Delivery
Full Specifications on Request.

ENGEL & HEVENOR
220 BROADWAY, N. Y.

WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc **Remember our initials stand for our product.**

CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

Get Our List and Prices.

J. F. DONAHOO CO., Birmingham, Ala.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

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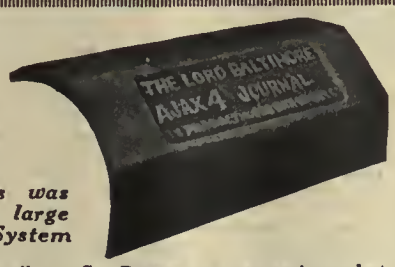
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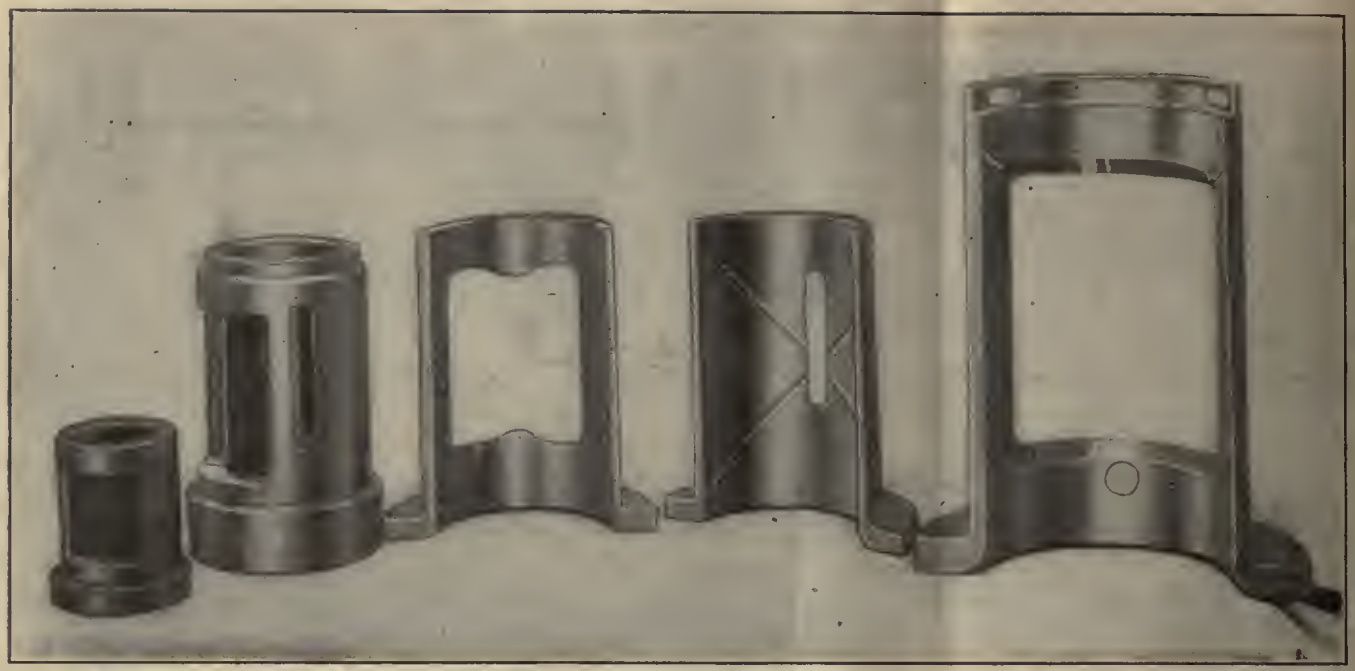
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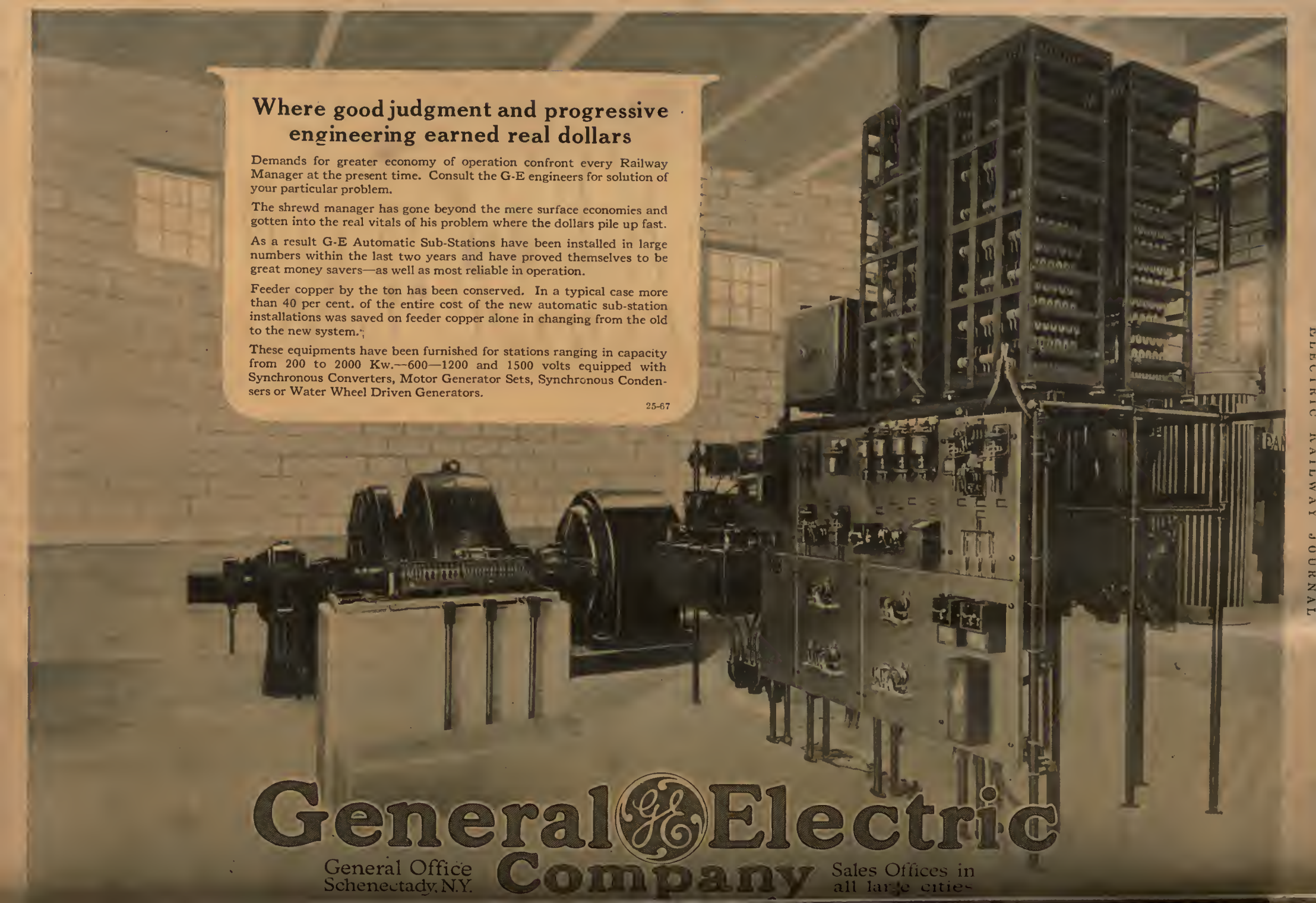
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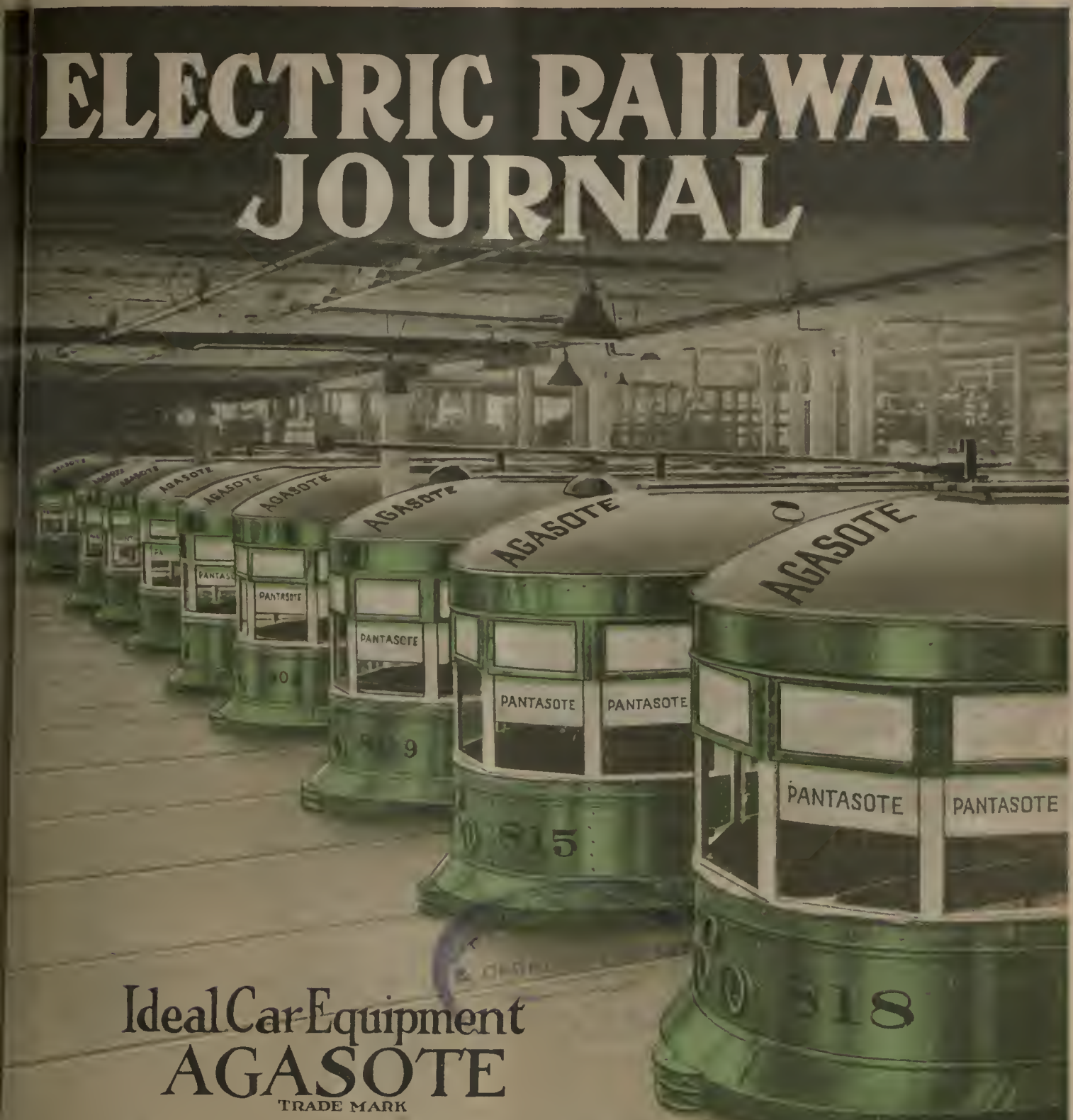
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PANT



Preparation

"Joe," said the Vice-President, "this statement showing the cost of fighting snow last winter is staggering. Nearly 40% of our equipment failed during a few weeks. We must do something to prevent a repetition of this next season."

"It is staggering, Boss," answered Joe, "I made up that report so that you could see exactly what it has cost us in dollars, without mentioning the loss due to the crippled service that followed. The only way to overcome this is to provide adequate snow-fighting apparatus, and take steps this summer and fall to thoroughly renovate our equipment."

"All right, Joe," said the Vice-President, "let us do it. The cost of the snow plows and sweepers is such a small amount, compared with our loss last winter, that there is no question about it."

"My recommendations," replied Joe, "are that we equip these outfits with good husky motors and control. Westinghouse No. 306 or No. 310 motors and HL control is the best equipment for them."

Westinghouse Electric & Manufacturing Co.

Sales Offices in All Large American Cities

East Pittsburgh, Pa.

1141

Vol. 56, No. 3 New York, July 17, 1920 *Pages 107-158*

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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Circulation of this issue, 7,900 copies

Advertising Indexes—Alphabetical, 76; Classified, 70, 72, 74; Searchlight Section, 66-69

"BUNGALOW" Air Compressors are especially suited to the low, light-weight "Safety" Car

Familiar Type of "Bungalow" Air Compressor



More than 2,287 "Safety" cars, now running on 109 different electric lines throughout the United States, are equipped with "Bungalow" air compressors

Westinghouse Traction Brake Co.

General Offices and Works,
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Typical "Safety" Car

OFFICES:

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Los Angeles, Cal.	St. Paul, Minn.
Mexico City, Mex.	Washington, D. C.



"They Keep Us Steppin'"

Said the jitney men during the first week that safety car service on 2- and 3-minute headways was put out to deal with the jitney pirate in the only way that has proved effective.

But hardly before that first week went by, quite a number of jitneurs had done their final "steppin"—they had stepped down and out!

Because no longer could they work the cheerful game of starting out a couple of minutes ahead of the trolley to pick up a lot of impatient Americans willing to take anything that would get them there *quick*.

For with short-headway safety cars in operation, the drivers soon discovered that the number of people waiting at corners had mysteriously shrunk in half.

This isn't fancy—it's *fact*. Name on application if you want to see for yourself!

Yes, yes. It goes without saying that we're referring to them as Safety Cars because they *are* Safety Cars, being equipped with the famous safety devices combination of this company. No car is a Safety Car unless it is equipped with automatic, laborless apparatus, so interlocked, that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the airbrakes and sander applied immediately thereafter and the doors unlatched for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

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CHICAGO Railway Exchange Bldg.
WASHINGTON, D. C. Munsey Bldg.
NEW YORK City Investment Bldg.
PITTSBURGH Westinghouse Bldg.
SAN FRANCISCO Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

Phono-Electric

Tacoma's Standard



About six years ago the Tacoma Railway and Power Company began to put up No. 00 Phono-Electric Trolley Wire on Downtown Curves.

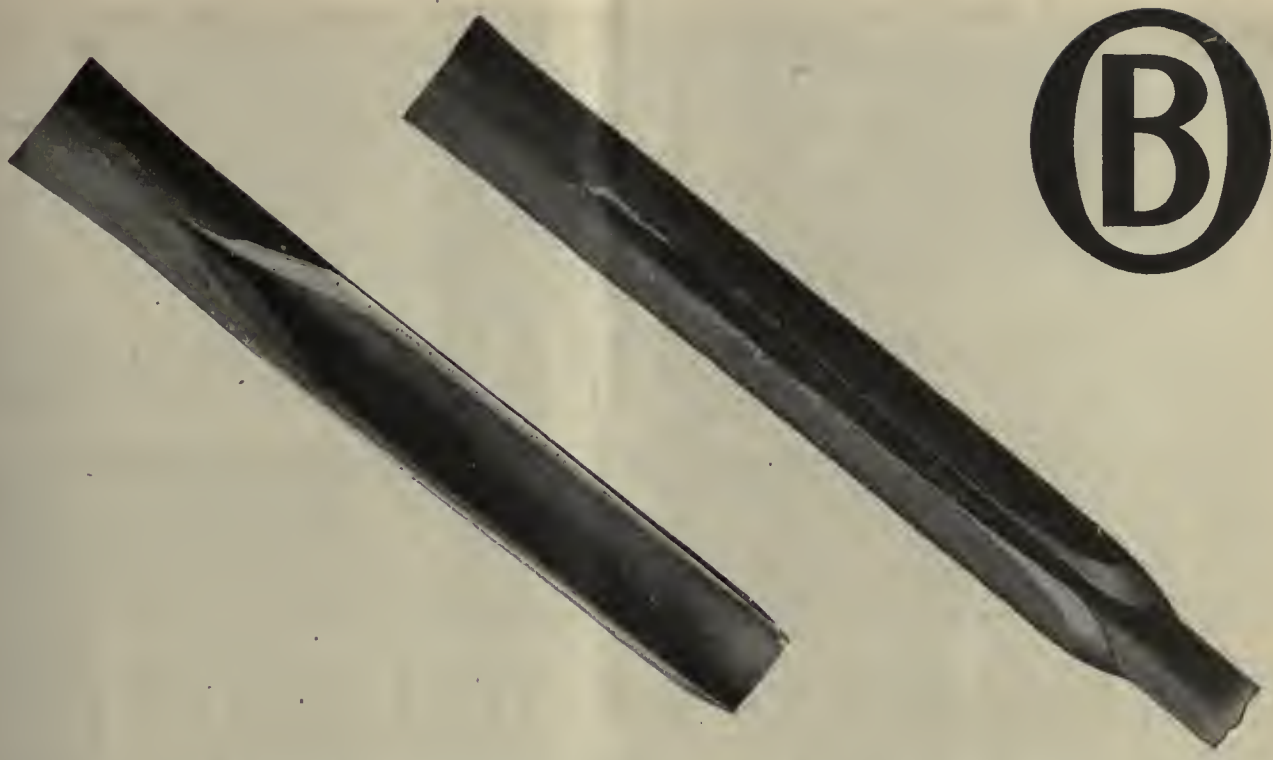
With the result that it was made the standard wherever service (on tangent, curve or cross-over) was severe.

Thus Tacoma has put itself in the class of the companies that have reduced their overhead line troubles to the minimum because "overhead" is not a frequent source of trouble where Phono-Electric is used.

Bridgeport Brass Company

Bridgeport Connecticut

2228



O-B TROLLEY SPLICERS

(Patented)

Smooth Underrun—Every Time

When the lineman swings the hammer on the O-B Splicer lips they close tightly around, under and against the wire.

They must fit. Their patented shape guarantees it.

The trolley wheel travels smoothly from trolley wire to splicer body—finds neither bump nor depression. As a result wire, splicer and wheel last longer.

O-B Splicers even after heavy service are stronger than the wire for which they are intended.

Made of a special tough, wear-resisting bronze.

There's an O-B Splicer for lightest city work, for heaviest electrified steam road duty and for every condition between.

Pages 380-387 *Catalog No.* 17.

The Ohio Brass Company, Mansfield, Ohio

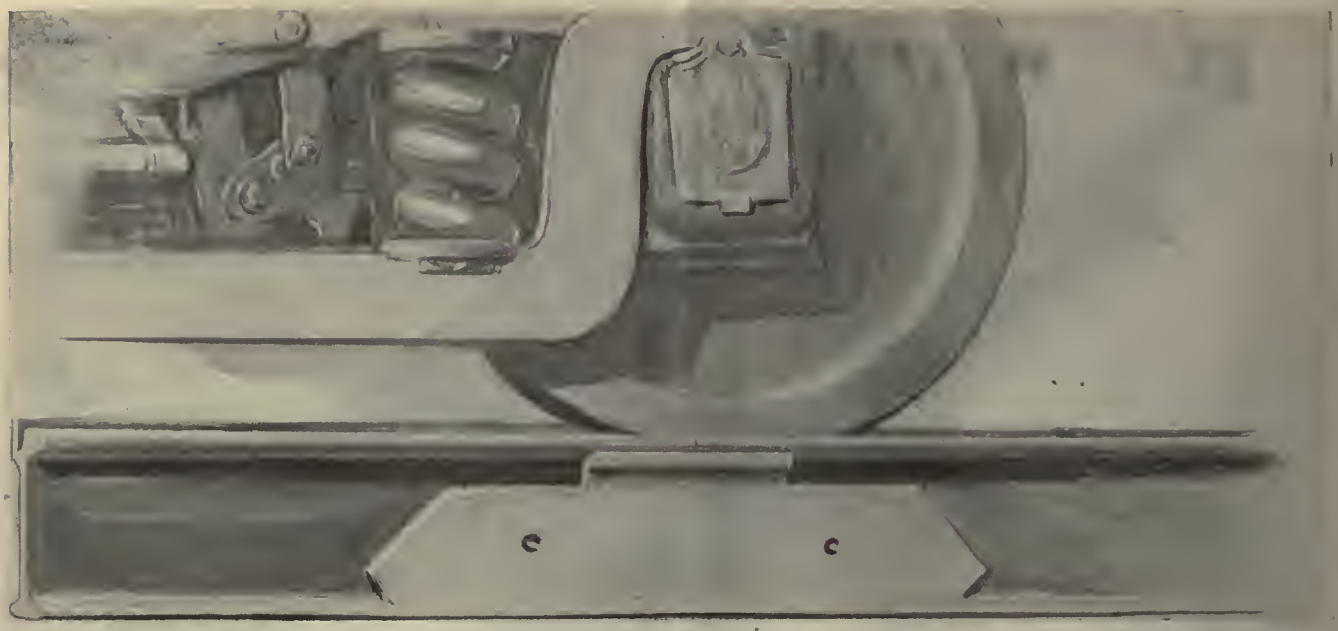
New York Chicago Pittsburgh Philadelphia Los Angeles San Francisco

Manufactures: Trolley Material, Rail Bonds, Car Equipment, High Tension Insulators, Third Rail Insulators



O-B Cleveland Splicer (patented)

Can be furnished with 5/8-inch boss. A popular splicer for heavy duty. O-B Cleveland is one of a family of O-B Splicers—all with the same basic features. But each takes care of some specific service. The right one for you is among them.



INDIANAPOLIS SWITCH AND FROG

BROKEN RAIL JOINTS OUT ON THE LINE AND BROKEN TRUCKS IN THE SHOP
can be built up as good as new with the Indianapolis Electric Welder and

INDIANAPOLIS Fluxated Welding Steel

PAY-AS-YOU-SAVE

Indianapolis "Apex" Welded Joints
ARE THE STANDARD ON HUNDREDS OF RAILWAYS

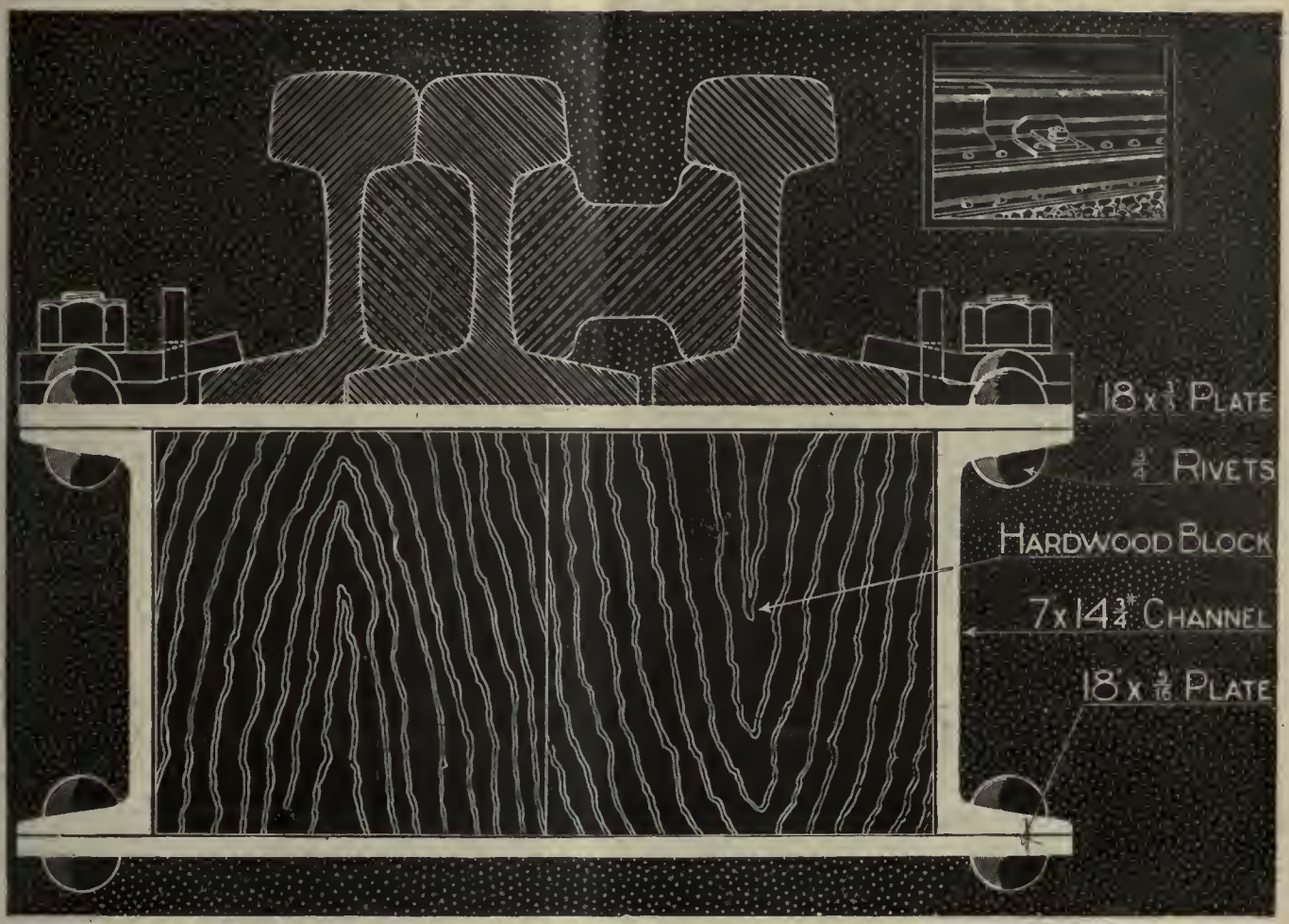
EMERGENCY WELDING

Typical of electric railway shop practice, is the method by which the Augusta-Aiken Railway & Electric Corporation has welded broken pedestals without removing the truck from the car as illustrated and described in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1920, page 400. In one instance, the break occurred on the side of the pedestal, in another case on top of the pedestal. Seven hours, four of which were required to do the actual welding, was the time taken to complete the first job. Three other cars with similar breaks were repaired with complete success.

Keeping the cars out on the line is as vital to the electric railway as keeping down to a minimum the expense for repairs and renewals. The INDIANAPOLIS ELECTRIC WELDER will do both, as it is now doing and has done since 1912 on hundreds of railways in the United States. It took years to put on the market a welding steel that would meet successfully each and every welding condition. We now have it. Tell us your problems and we will send you the grade of metal that will give you the best results obtainable. Protect your operators with our new Composite Eye Lenses which absolutely exclude all violet rays.

Pay-as-you-save-as-you weld.

Indianapolis Switch & Frog Co., Springfield, Ohio



Give the Crossings a Chance to *Wear Out*

MANY CROSSINGS end a short, expensive life by going to pieces for lack of a suitable foundation. Given even fair support, they would stay in the track months longer.

Supported on International Steel Crossing foundations, crossings *wear out* with filler blocks intact and bolts tight. Wear on the head of the rail becomes the factor which determines renewal of the crossing with the same foundation good for one or two more service periods.

The fortunate combinations shown in the drawing above absorb the twisting strains and impact of heavy service and distribute them over a large spread bearing on the ballast.

Write for catalog and full particulars, today.

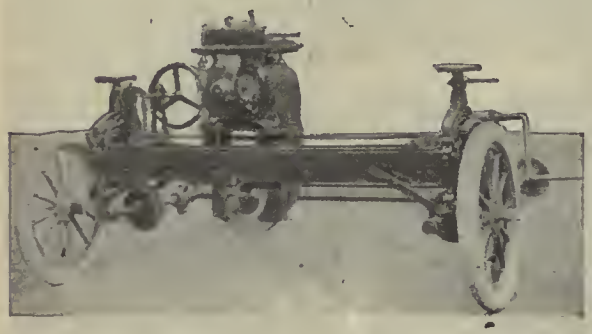
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

16704 Waterloo Road, Cleveland, Ohio

ALL FOR YOUR SERVICE OUR SERVICE FOR ALL

The Universal Rotary Track Grinder



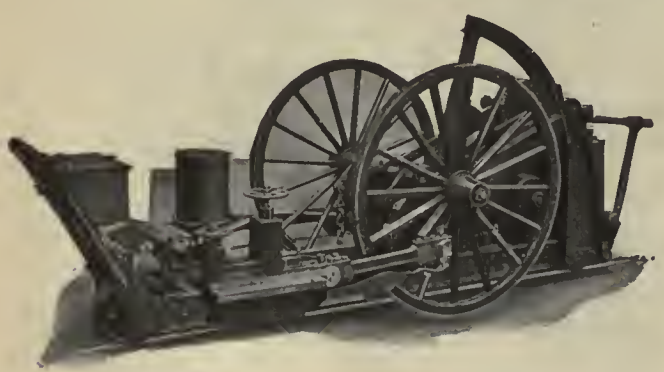
That surplus metal, that is left on the track after a low or cupped joint is built up, is easily, quickly and economically removed with this grinder. It has a grinding wheel that may be tilted to meet any angle of the rail head—Outboard Bearings, Grinding Wheel Guides and many other important features.

The Atlas Rail Grinder

Especially adapted to getting into the grooves of girder rails, frogs, switches, etc., and for removing surplus metal used to fill up low joints. The Grinding Wheel travels over track in guides.



The Reciprocating Track Grinder



With this grinder it is impossible for the grinding element to fall into a low spot. Especially adapted to grinding out corrugations, slightly cupped and new joints where a planetary grinding surface facilitates the work. Produces best results in grinding with removal of minimum of metal from rail head.

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

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ELECTRICAL ENGINEERING & MANUFACTURING CO. Pittsburgh, Pa.

CHAS. N. WOOD CO. Boston, Mass.

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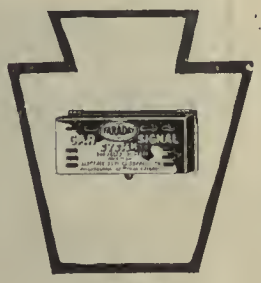
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"Golden Glow" Headlights



Keystone Trolley Catchers



Faraday Car Signals





Illuminated Car Signs



Keystone Rotary Gongs



Keystone Air Sanders

Write for Bulletin 167, showing 26 Safety Car Specialties.

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Manufacturer of Railway Material and Electrical Supplies

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TRAVELS TO TOWNS WHERE THERMIT INSERT RAIL WELDING TERMINATED TRACK TROUBLES



Thermit Insert Rail Welding in Dallas.

DALLAS

Dallas, one of the most progressive cities of the South, is progressive in city track construction as well as in other things.

Out of about 700 THERMIT INSERT RAIL WELDS installed in Dallas during 1915 and 1916 only 7 breaks have been reported, or only 1 per cent. The breaks occurred only in the case of certain compromise welds.

It is easy to figure from this extremely low break percentage enormous savings in rail maintenance costs as compared with the rail deterioration where mechanical joints or semi-welded joints are used, and which inevitably result in pounded joints, cupped rails and expensive track maintenance.

Send for Railwelding Pamphlet 1232.

METAL & THERMIT CORPORATION
120 Broadway
Chicago San Francisco
Pittsburgh Toronto

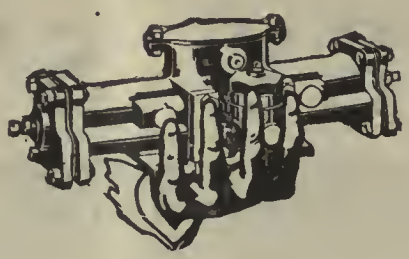
SERVICE STRENGTH THERMIT WELDING ECONOMY



"Next Stop, San Antonio!"

"They Also Serve Who Only Stand and Wait"

Standardize! *Pneumatize!*



You can't afford to pay men for standing around and waiting, whether its minutes at the car house or seconds on the car platforms.

To get the greatest number of car-miles per man per hour or day, every needless "standing and waiting" interval must be eradicated—and most decidedly during the rush hours.

Every moment that the motorman is impatiently stamping his feet or clanging his gong for that "go ahead" signal is another *money* moment lost—moments that you pay for through heavier platform cost and lighter income—

Because your conductor is losing time through having but one pair of hands to guide passengers, collect fares, operate the doors and give the starting signal.

NATIONAL PNEUMATIC "RUSHOUR" cars or trains do not suffer these losses because of their incorporation of ***National Pneumatic*** Door Engines, Interlocking Safety Door Control and Door and Step Operating Mechanisms which are indispensible to

Make your peak periods produce maximum profit and efficiency

National Pneumatic Company, Inc.

50 Church St., New York Edison Bldg., Chicago

Works: Rahway, N. J.

—and there's but One

Powdered Coal

The real solution of the Fuel Problem is to burn coal in pulverized form using the

QUIGLEY SYSTEM

Coal is the cheapest fuel for industrial use. It is being burned in pulverized form at practically 100% efficiency when properly prepared and properly handled and burned by the Quigley System. It has proven more economical in actual operation than oil or gas on a B.t.u. basis.



Firing Boilers Using the Quigley System

Coal Situation Slightly Bett... Fuel A...

COAL PRICE UP ... DROPS

1920.

AIMS TO HALT COAL EXPORT...

Than During the ...fficial Says.

...y.—The statement that coal situation in New ...idly growing worse was ...Storrow, state fuel...

Fuel Economy Still Vital

DESPITE the urgent need for it does not hear much about fuel ...larly in power plants. It may be th... are so busy practicing it that they ... about it. This is, of course, true ... quality of the fuel that many pla... engmeers no little worry to burn... of burning it efficiently. We m... seriousness of the fuel situa... these days to warrant neglect... pays for it. It is every bit ... ligently, to stop preventabl... to consume power saving... the war.

In the large modern ...

PRIORITY COAL IS ORDER EXPECTED HERE MONDAY

Provisions Will Be Made for Public Utilities.

Monday may see New York on ... same priority basis in the matt... coal supply as New ... ing to J. W. Ho... the Tidewater Co...

...Are Below Normal

...Shipments Expect...

COAL SHOR... STOP

...ling May ... Coal Crisis

Still

OIL NATURAL GAS

Relative B.T. Us...

Answer—

Powdered Coal Plant with Compressed Air Transport

Details of the System That Wi in the Mount Vernon Street P of the P. R. T.

RING the pres ransit Co power p ng waste issue c e Quigley s from c panying everal pa The dra d to show applied on the

BIG BUILDINGS HERE CAN'T GET COAL SUPPLIES

Apartment House O Only Given Enough for Few Days

Barrett Deman War-Time Con To Conserv

Heating Service Co er Declares Famine

MAY ET CARS

AL CRISIS HERE, ORSE TO ME.

NEW YORK T

Coal Shortage Now Threatens Homes in Ci

Curran O In G

Recommen Chang

Only 171,000 T ss Than Week's Sup Hand, Cooking mine Is For

ES

Buyers Pay For-

POWDERED COAL USED AS NEW POWER FUEL

ives 100 Per Cent Satisfaction, Says E

UTILITY COMPANIES WORRIED OVER COAL

from Interstate

Relief Com

NE BL

Public Utilities Seek Coal Relief



Four Fuel Feed Controllers driven by one Constant Speed Motor. Hand Chains regulate Flow of Fuel.

The QUIGLEY System

for Preparing, Transporting and Burning Powdered Coal

The equipment used in the Quigley System for the preparation of fuel, crushing, pulverizing, etc., has been especially selected for its adaptability for the work from the large variety of equipment available.

It is standardized according to capacity as part of a complete pulverizing equipment based on tons treated per hour.

By compressed air, pulverized fuel is transported in bulk from the pulverizing plant through small diameter mains to bins at furnaces.

By means of a hand wheel, absolute control of fuel fed to burners is obtained. Close regulation of air and fuel gives maximum firing efficiency and enables the operator to secure any condition of flame desired.

All installations of the Quigley System have given satisfaction from start of operation. We are effecting economies in fuel consumption which are highly satisfactory, have reduced operating and labor costs and increased furnace output.

PRODUCER GAS | COAL FIRED | POWDERED COAL

ent at Present Fuel Prices

QUIGLEY FURNACE SPECIALTIES COMPANY, Inc.

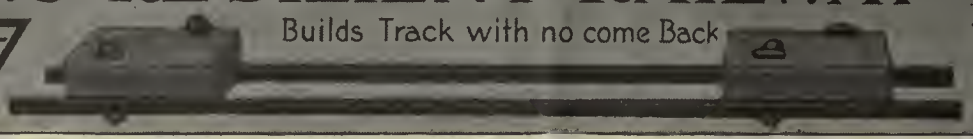
Engineers and Contractors for Complete Systems for Preparing Transporting and Burning Powdered Coal

26 Cortlandt Street NEW YORK, N. Y.

Bulletin 11J on request

The RESILIENT RAILWAY TIE

Builds Track with no come Back



How is the concrete track foundation preserved by the

Resiliency

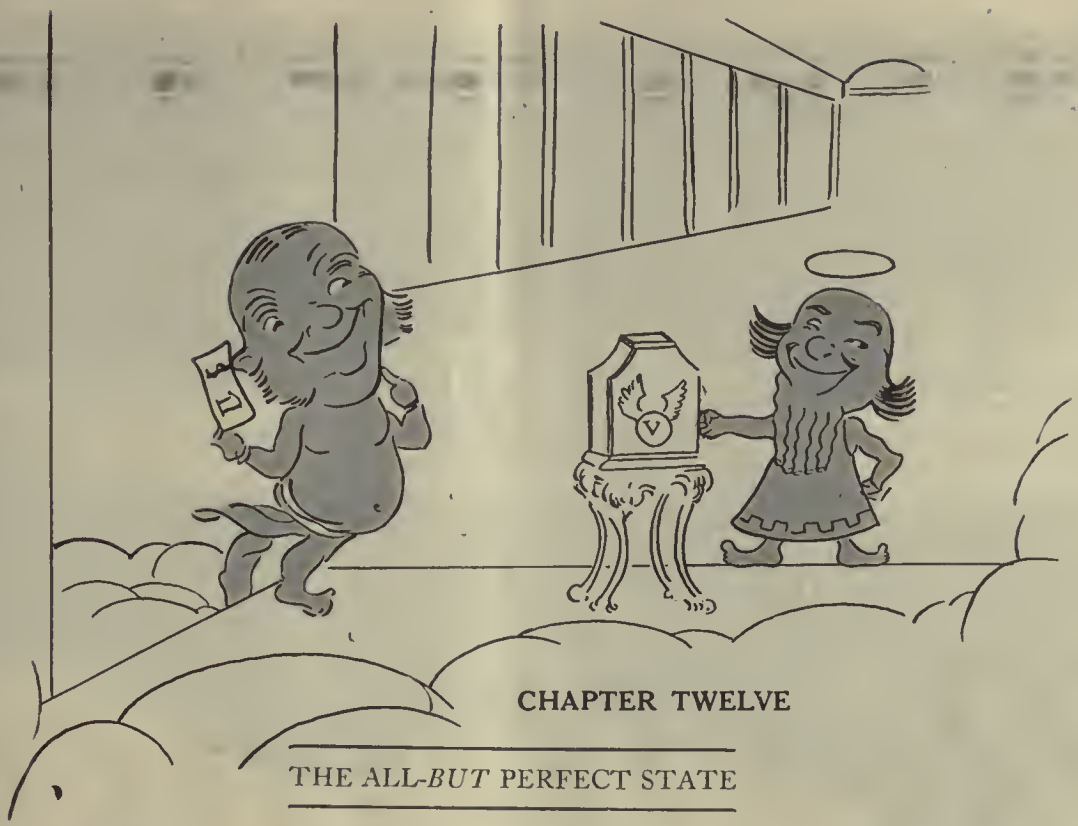
of the Dayton Mechanical Tie?

Who would try to pulverize concrete with a rubber nosed hammer?

The Asphalt cushion of The Resilient Railway Tie is interposed between the hammer blow of the cars and the concrete. It is putting a rubber nose on your hammer.

Build your track with no comeback.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BLDG., DAYTON, OHIO



CHAPTER TWELVE

THE ALL-*BUT* PERFECT STATE

The Abolition of the Conductor

For those who are wondering about the duties of conductors in the All-But Perfect State let it be announced here that there will be no conductors there.

On no car will there be a man whose sole duty it is to collect fares and ring them up.

In his place will be the road salesman whose job it is to *sell rides*.

And just like salesmen in any commodity line he will enthuse his buyers-of-rides.

Heaven knows the street railways have the biggest bundle of value to sell outside the value represented by the Dynamotor in the form of rides—but who is selling this value to the customers?

It seems that there can be no bigger job than putting salesmen at the point of contact with customers —wherefore in the All-But Perfect State the high grade salesman will supplant the automatic acting conductor.



READING NUMBER TWELVE

Q. Who is the proper official on a railway to start the movement toward adding a Dynamotor to track maintenance equipment?

A. Take the organization diagram of the road and place your finger on any of the names. That man has an interest in properly bonded rails. He also has an interest in good shop welding. He is the man to start something.

Rail Welding and Bonding Company

Formerly The Lincoln Bonding Co.



Cleveland, Ohio.



There are many ARMCO Culverts in the Yosemite Valley

THIS one, 48 inches in diameter, was installed in 1911. The ice and snow of nine winters and the torrents which come with the melting snow and heavy rains of spring have caused no damage to this sturdy culvert. When this photograph was taken, in January of this year, the culvert was in perfect condition.

The proof of the permanence of ARMCO CULVERTS made from rust-resisting American Ingot Iron is to be found in the many installations made ten or more years ago in all parts of the country—and in perfect condition today.

The increasing use of ARMCO CULVERTS by experienced Engineers and Highway Commissioners is convincing testimony to their enduring qualities.

TRADE MARK ARMCO REG. U.S. PAT. OFF.
AMERICAN INGOT IRON
RESISTS RUST

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting **ARMCO CULVERTS** and other products of American Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping points on products in which you are interested.

ARMCO IRON CULVERT & FLUME MFRS. ASSN.
TRANSPORTATION BLDG. CHICAGO

U. S. SIGNALS



For Safety Cars

To promote the interests of the Safety Car and its one man operation, unnecessary delays must be eliminated.

When the motorman is forced to leave his car to throw a signal, the car is deprived of its only authorized operator. This means delay, which is detrimental to your schedules. Your passengers become dissatisfied —your revenue suffers.

You should have automatic signals, big, reliable, economical signals such as U. S. Electric Signals. They make Safety Cars safer and schedules secure.

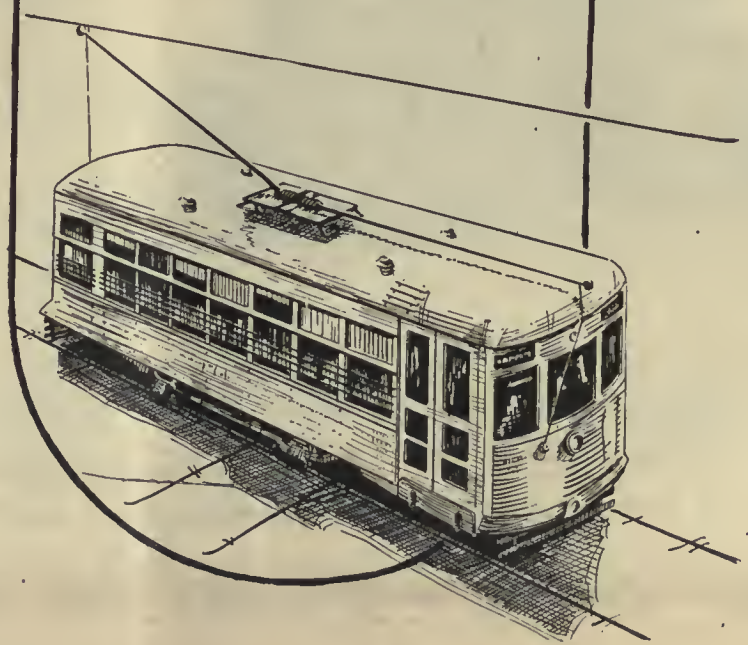
Send for Bulletin

United States Electric Signal Company

West Newton, Massachusetts

Representotives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco. Foreign: Forest City Electric Servlce Supply Company, Salford, Eng.

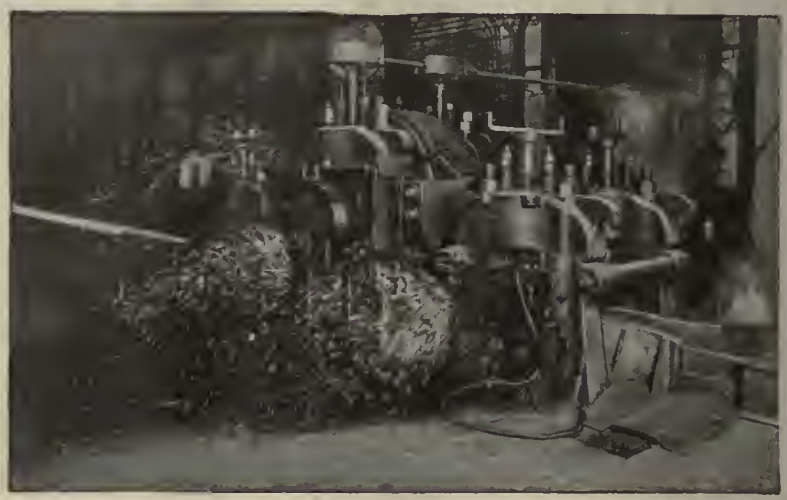


LACKAWANNA AIDS TO BETTER TRACK

Lackawanna

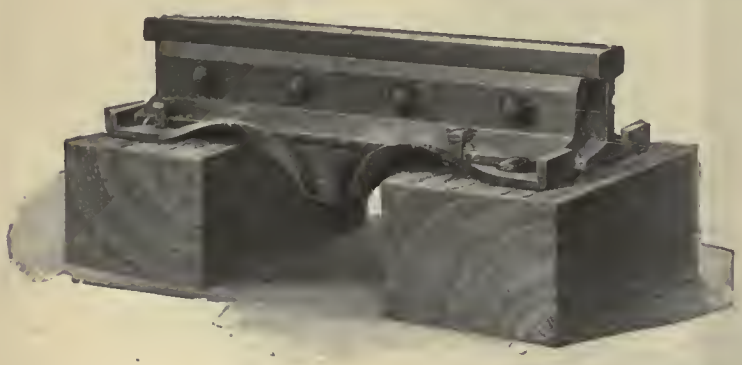
Deseamed Rails

Rails manufactured in the usual way retain in their outer surfaces the soft, partially decarburized metal which is characteristic of an exterior layer on all steel ingots. The only proven way to get the desired hard running surface and sound base essential to rail efficiency and economy is to eliminate the weak metal at the important head and base locations. The Lackawanna Deseaming Process does this. During the rolling of the rail, just after the roughing passes, the bar is passed through the Lackawanna Deseaming Machine. A milling cutter removes the relatively soft, partially decarburized outer surfaces at the important locations of the rail head and base. The succeeding and final rolling is thus made upon the harder interior part of the bar where the carbon content is higher. The resulting rail is free from seams in head and base and the wearing surface of the head is so much harder that a rail treated by this process will wear many times longer than the same rail untreated. The base will have no flaws to open up under flexure and cause failure. Send for our booklet, "The Lackawanna Deseaming Process."



This is the Lackawanna Deseaming Machine which mills the soft, partially decarburized metal from the location of the rail head and base, the milling process being applied to the partially rolled rail and permitting the finishing rolls to complete the work on hard, dense interior metal.

The Abbott Rail-joint Plate



The Abbott Plate supports the wheel load and transmits it to the two joint ties as completely and in the same manner as a short deck bridge puts load upon its piers. In other words, the splice bars are practically relieved of other duty than overcoming lateral thrust and maintaining lateral alignment, while the Abbott Plate *unfailingly* holds the track surface up to the right level for smooth running.

This reinforcement against vertical thrust eliminates the worst cause of worn, bent and broken bars, stretched bolts, loosened nuts, and battered rail ends, and adds greatly to safety.

As an independent part, the Abbott Plate can be and is made harder, stronger and more elastic than the splice bars. A slight camber at the center, together with the high resilience of the axle steel we use, brings the rail ends to bear first, until, as the wheel load approaches, the plate depresses into a full flat bearing with the rail bases and gives them the solid support of the two joint ties.

Other features of the Abbott Plate, too numerous to mention here, make the installation pay for itself the first year and provide otherwise unobtainable benefits.

Ask for our booklet
"Improved Track Appliances"



LACKAWANNA AIDS TO BETTER TRACK

Lackawanna

Safety-Head Angle Bars



It is a well known that bar or beam with its original skin metal unbroken will safely withstand heavier transverse stresses and consequently heavier loading than where the edge or surface is abraided. If nicks or abrasions in the metal's surface are near the center of the beam and come under tension, the breakage will always develop in the nicked or abraded spot. An angle bar or a splice bar on a rail joint is an illustration of this principle. Under passing trains the rails are flexed downward under the rolling wheels and then lifted or bent upward as the load passes the joint, the undulating motion being similar to that which occurs when a load travels over thin ice. This undulation or wave motion of the rails causes first a wearing or cutting of the angle bar at the top by the sharp under corners of the rail heads. Then when the upward thrust occurs, as the wheel load passes, the head of the angle bar is brought into tension and a nicked or worn bar quickly develops into a broken joint with its consequent disaster. The principle of the Lackawanna Safety-head Angle Bar is to prevent this wear or notching at the center and thus eliminate the initial cause of broken bars. Reference to the illustration herewith will show how this is accomplished.

This illustration shows the slight depression in the center of the Lackawanna Safety Head Angle Bar, which prevents contact with the sharp undercorners of the rail heads. This depression is put into the bar while hot and the original skin metal is thus preserved. The metal in the angle bar retains its tough rolled surface without wearing or upsetting under the action of the wheels at the joint, and the bars are much better able to resist the upward flexure under passing loads.

Hook-Shoulder Tie Plates



The Lackawanna Hook-Shoulder Tie Plate is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs, and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

Track Bolts and Spikes

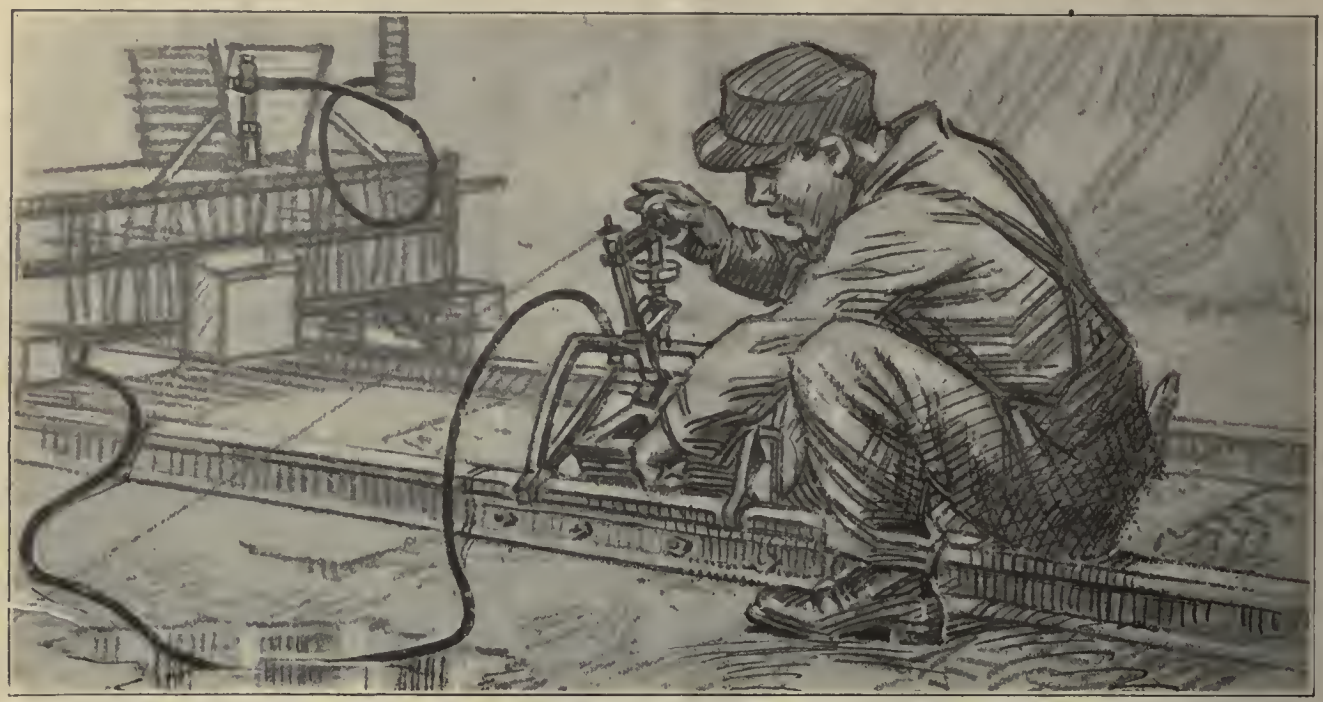
The manufacture of Lackawanna Track Bolts and Spikes has always been marked by critical attention to detail and constant endeavor to give the trackman the best possible service and efficiency. Our facilities for manufacture are thoroughly modern, ample, prompt deliveries of quantity orders, and, as the metal is worked up from the ore complete in our own plant, we can offer every assurance of high quality coupled with manufacturing skill and painstaking effort. Lackawanna Track Bolts are furnished with either cut or rolled threads, the latter of either the standard or buttress (Harvey Grip) type. Either square or hexagon nuts are furnished, the latter at slight extra charge, to cover the greater manufacturing cost. We also supply Lackawanna Recessed Nuts, which are $\frac{1}{8}$ to 3-16 inch thicker than the ordinary type and have a depression in the bearing side as a substitute for hexagon nuts in the matter of clearance, while otherwise having all the advantages of the square nut. Write for our booklet, "Lackawanna Track Bolts and Spikes."

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The Quality Cord

In which wire, "better-than-Underwriters"—rubber and the famous *woven* cover are united to form a portable cord for service where safety, durability and certainty are paramount, as in testing out car equipments, using pit-lamp extensions, making shop-welding sets 100% available, securing trolley connections to track tools in outside work such as grinding, drilling, bonding, welding, etc.

DURACORD is made in all sizes from No. 18—2 conductor for extension lamps, to No. 0000 single conductor for welding and motor leads.

Send for samples of DURACORD and ordinary cord.

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Five years ago we submitted to you as protection for car-wiring DURADUCT (durable duct) as a successor to flimsy, unsafe hose; awkward inaccessible trench boxes of wood; or costly, heavy piping of metal.

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-like all good machines they require attention

Johnson Fare Boxes have proved to be dependable and reliable under the most severe operating conditions. But like every other well built piece of mechanism they require a certain amount of care and attention if they are to function most efficiently.

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Johnson Fare Boxes are more important and more valuable on your cars than typewriters or adding machines are in your office. Give them at least the same care and attention.

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Order Based on Experience with

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The Watchdog of Your Power and Equipment

AFTER A thorough competitive test in 1917 The Milwaukee Electric Railway & Light Company installed 350 ECONOMY Meters on double-truck cars in heavy city service in Milwaukee.

Based on the experience with these, an order has just been placed for a large number of additional meters for other cars in Milwaukee city service, and for a complete equipment for all the cars of the Racine city division of this property.

Thirty or more safety cars and thirty or more double truck cars in Racine are to be equipped with ECONOMY Power Saving railway meters complete with INSPECTION DIALS for inspection and oiling of rolling stock on the basis of kilowatt hours consumed.

The ECONOMY Meter induces savings in power consumption and in car house labor.

ECONOMY ELECTRIC

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AT MILWAUKEE

350 Economy Meters Since 1917

SAVING ON CARS

NO MATTER what method of training a motorman is given, whether he is coached to reduce his power-on-time, to increase his coasting time, to decrease his braking time —or all three—if he improves his car operating efficiency the ECONOMY Meter will credit him with a true record of the power he saves.

There is no mystery in power saving with the ECONOMY Meter. It employs the only direct method. It meters the energy consumed at the car. The motorman "sees what he saves." The ECONOMY Meter is a rugged, durable, accurate device—simple, reliable and easily understood. It pays for itself quickly.

Install ECONOMY Meters and save 10 to 20% of your traction power.

We should like to talk with you about the low cost of substantial savings as applied to your property.



The Watchdog of Your Power and Equipment

DEVICES COMPANY

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BOUND BROOK BUSHINGS
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The Safety Car saves time and labor in maintaining service. Bound Brook Oil-less Trolley Wheel Bushings save time and labor in maintaining the car in service.

They have a self-contained lubricant that never gives out.

Regardless of speed, regardless of attention, they are always lubricated.

On those Safeties, the elimination of loose chattering trolley wheels, the attainment of perfect transmission and the reduction of burnt shunts and other harp troubles means safety and security.

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"Specialists in the manufacture of Oil-less Bushings for more than a third of a century."

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Eliminate Wheel Turning Costs

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is the concentration of the best advertising ideas and plans applied to car cards.

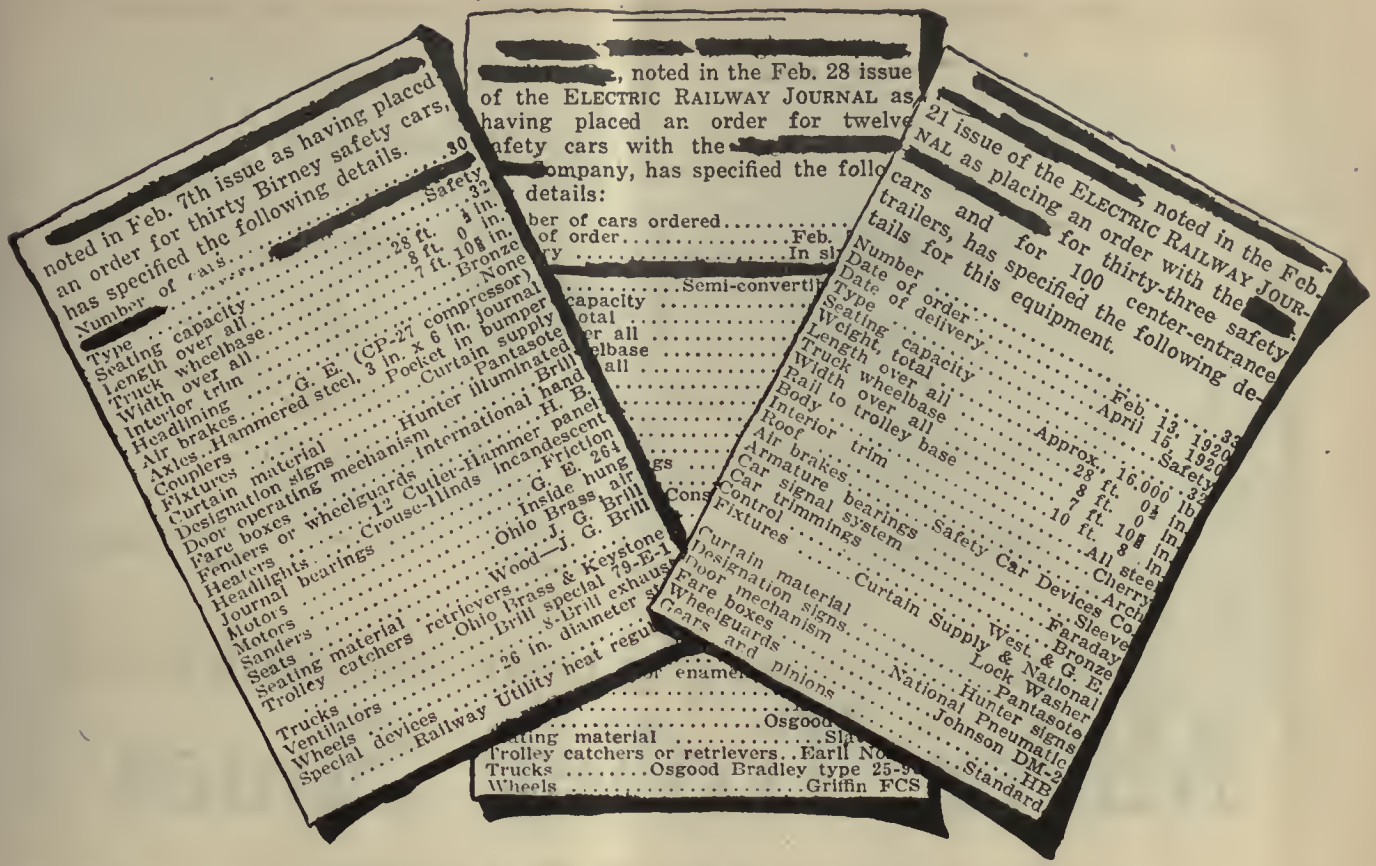
To the electric railway this means a regular monthly check which assures a permanent and steady income.

Collier Service is nation wide in scope. It reaches all and serves all

Barron G. Collier INCORPORATED

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Make 'em completely safe by BOYERIZING

If you didn't order Boyerized Brake Pins and Bushings for those Safety Cars in advance, you can do the next best thing by installing them on your safeties when they arrive from the car builder.

Boyerized Brake Pins and Bushings may add a little more to the first cost of your safeties, but they are so superior in uniformity and mileage to the ordinary case-hardened article that you cannot afford to take chances with material of unknown quality and uncertain life.

To *Boyerize* means to lengthen the life of your equipment and to lower the cost of your upkeep.

Other Boyerized Specialties Are:

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Smashed poles are unknown with

Miller Trolley Shoes



This is an absolute fact, because never yet has a Miller Trolley Shoe been responsible for a bent or broken pole and the damaged car-roof or torn-down trolley wire which often results therefrom.

For the reason that the Miller Trolley Shoe is made to hug the wire for better for worse with a constancy that your transportation, track and car maintenance department will appreciate as soon as you give them the opportunity to become acquainted with it.

Numerous Electric Railways are already using the Miller Shoe with marked success. We want to acquaint you with this shoe and ask you to write us for full particulars.

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Eliminate that smoke!



—and the intense heat and dirt of fuel burning rivet heaters

No man can work at his best while breathing smoke and fumes from a coke or fuel-oil furnace. Frequently work is impossible for some time after the furnace is started. In summer the intense heat thrown out is apt to cause prostrations and it surely reduces output.

The Berwick Electric Heater eliminates all these troubles. Can be placed close to the work without discomfort to workmen or damage to newly painted or finished surfaces. No dirt or drippings to be cleaned up.

BERWICK ELECTRIC RIVET HEATER



Saves a Dollar

on Every Hundred Pounds of Rivets Heated

—Reduces burning and scaling to less than ½ of 1%.

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—Easy to operate. Perfectly safe.

Send for catalogue. State rivet requirements and alternating current conditions.

American Car and Foundry Company

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7



TEXACO LUBRICANTS

for railway shop, power plant and rolling stock

Texaco Lubrication Engineers will gladly assist you in selecting the right Texaco Lubricants for your shop—power-plant, rolling stock, or any other equipment.

You may call upon them to make a survey of the equipment if necessary. This is Texaco Service—there is no charge.

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Keeping Abreast With the Times

The above picture shows the first Electric Cars used in this country and the picture at the bottom of the page the new one man Safety Car which is the latest type of car used today.

Note the great progress that has been made in these comparatively few years in Street Cars.

Just so has this progress been made in Galena Oils and Galena Service. Our research and engineering Departments have worked hard to keep one or two steps ahead of the times and today—just the same as in 1869 when our business was founded—we stand in advance of the progress of the times.

Galena Service is now working at maximum efficiency in the work of producing betterments in operation through scientific methods of lubrication.

When Galena Service Goes In, Lubricating Troubles Go Out!



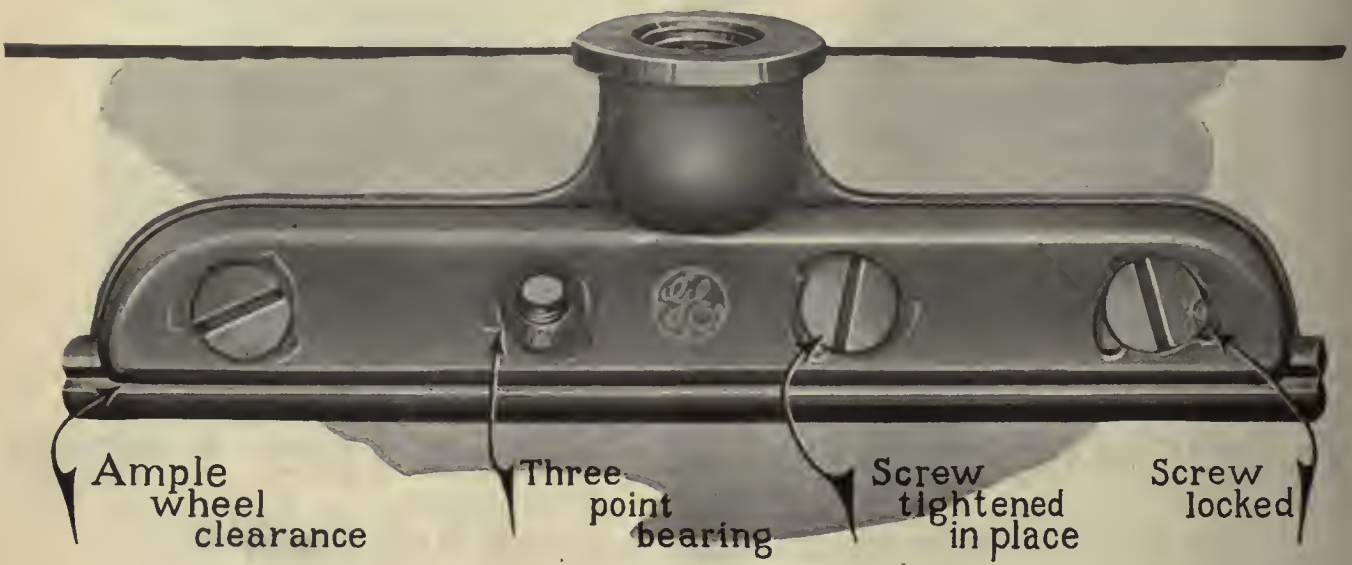
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Exclusive locking feature insures dependability of Form A Clamp

Little features of design, exclusive G-E patents have placed the Form A clamp in a class by itself.

The triple lock countersink, for instance, makes it possible to lock the ear securely to the wire by a hammer blow on each screw-head opposite one of the nicks in the countersink. The screw thread is not damaged and yet the screw cannot back out in service. Thus the clamp is easily installed or replaced.

The bevelled lips of the clamp give ample trolley wheel clearance and G-E electric oven sherardizing protects the clamp from the weather.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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The Torque-Producing Ability of the Electric Motor

THE principal difficulty which has been experienced in the design of electric locomotives has been in the mechanical parts. The electric motor is so inherently different from the steam engine in the character of its output that it is natural that time should be required by designers in learning to adapt this motive power to heavy traction conditions. The electric motor, with almost unlimited power behind it, can produce torque many times in excess of its rating if it is overloaded. This is hard on the motor, to be sure, but it is worse on the mechanism driven by the motor unless provision is made for the resulting excessive stresses. When the steam engine is overloaded it simply "lies down" and refuses to injure itself. It can produce no more torque than is accounted for by the area of the piston and the "mean effective" steam pressure. The electric motor, if permitted to do so, will take on more load until either it is overheated and injured or until some mechanical part gives way. Failure fully and practically to realize this fact accounts for the high maintenance costs which have been incurred in some cases. As the mechanical difficulties are overcome, and they are rapidly being overcome, it will be possible still more fully to utilize the torque-producing possibilities of the electric motor.

This situation regarding the application of electric motive power to heavy traction reminds one of the early development of the electric motor itself. It will be remembered that inventors first made motors in imitation of the steam engine, with an iron plunger or core drawn into a coil of wire and then released, a device analogous to James Watt's in practically every particular except as to the service of the pull and push on the piston. This plan was soon abandoned for the more effective one of direct rather than indirect torque production. Just so in the case of the electric locomotive. In some cases the motor has been applied as a direct substitute for the steam engine, whereas it needed to be applied in such a way as most effectively to utilize its natural characteristics.

Sporting Events Assume a New Significance

TIPPITY WITCHET is the five-year-old son of Broomstick. One day recently he beat Salvestra under the wire at Belmont Park, with Gloomy Gus a bad third. That is history. It is not an omen of what Tippity Witchet may do the next time out. He may then be an also ran. There is no desire to tip you to a good thing. On the same day that Tippity Witchet won Babe Ruth again helped the Yankees to victory by crashing another home run into the grand stand at the Polo Grounds. If you are a railway manager operating under service at cost or if you ever hope to operate under that plan, then Tippity Witchet, Babe Ruth, Georges Carpentier and other celebrities of the sporting world hold more than ordinary interest for you.

Take Cincinnati! Under service at cost, patrons of the Cincinnati Traction Company, with the champion Reds drawing record crowds, have recently been paying a 7½-cent fare. If it were not for Pat Moran's ball team the fare might even be higher. In fact, we shudder to think what the fare might be if the World Champion Reds had finished last instead of first in the pennant race last season. In Cleveland the case is very much the same. No doubt Mr. Stanley knows just what effect the present spurt of the Indians is having on the fares under service at cost in his city.

Take Louisville! Louisville isn't operating under service at cost. It isn't even certain that the company will operate under such an agreement, but indications point that it may possibly do so. In consequence, the railway management there is said to have begun to figure on the results which the return of boxing under the new law in that State would have on fares under service at cost. Fight fans in Louisville are said to be hungry to attend the coming bouts.

Of course, sporting events have always had their deep significance for the railway manager as traffic problems and as sources of revenue, but under no other system than service at cost has the general public enjoyed the exhilaration of knowing that the more it spent for fare in the aggregate the less it would really have to spend individually. A *reductio ad absurdum*, you say. No such thing. Violent fluctuations in traffic are not in themselves desirable, but you can't blame a railway manager operating under service at cost if his risibilities rise at the thought of the effect of the Kentucky Derby upon the rate of fare he is charging.

Fares and Franchises

THE precarious condition of railway properties is not improved and investments in railway securities are not encouraged by the chaotic conditions existing in commission rulings on franchise clauses fixing fares.

When the Pennsylvania courts uphold the power of the state commission to fix fares irrespective of franchise clauses and at the same time the New York courts hold that the commission in that state has no jurisdiction over franchises granted during the thirty-three years which elapsed before the formation of the commission the interested observer wonders what it all means. There is such a mixed combination of laws, legal rights, precedents and interpretations in the various state court and commission rulings that the fundamental elements in the franchise clause versus fare increases controversy are sometimes obscured.

What remedy for its financial ills can a company

obtain when bound by a franchise fare clause and how can the public get adequate service?

Legal battles on a confiscatory basis, receiverships, etc., simply augment the bill the consumer must pay and prolong the agony. When an economic ill exists an economic remedy must be applied and the quicker the better. Until our regulatory commissions are empowered to exercise complete jurisdiction over all elements incidental to the successful operation of a public utility, are released from legal restrictions of procedure and evidence, are made up of a personnel experienced, judicial and far-seeing and have the respect of the public as a court, but without the court's formality, the utilities can hope for little aid from commission regulation and the public can ask in vain for more adequate service.

The rainbow in the cloudy sky of regulation lies in the public's realization of the fact that the most practical method for maintaining private ownership and operation of public utilities with public supervision is by commission regulation. Government ownership and operation or uncontrolled private operation and ownership are both unsound from the public's standpoint, so that the good old weapon "public sentiment" is ready to be wielded in defence of commission regulation and has already accomplished results in many states.

Rome was not built in a day, but we hope that commissions can obtain their proper jurisdiction and status in the near future in order to afford the railway industry and the public an agency, and apparently the only one, whereby they can obtain quick and common-sense decisions on vital but disputed points.

C. E. R. A. Takes Action to Rejuvenate Member Interest

IN LAST week's issue we devoted a great deal of space to material which had as its plain purpose the arousing of greater activity and the overcoming of backsliding on the part of all of us who have contributed much to and owe much to the electric railway industry. To read in this week's issue the report of the C. E. R. A. convention at Ottawa Beach, one sees a concrete example of the condition, not uncommonly prevalent in the industry, which inspired the subject matter of our July 10 issue. At this meeting one of the most important matters proposed by this central association in a number of years—the formation of an electric railway express company similar to the American Railway Express Company—had to be abandoned because of the lack of co-operation on the part of the committee members and later the company members generally. The chairman of the important committee on standards had to report no action because of his inability to get the members of the committee to take any interest or do any work. The subsidiary association of the accountants, in its meeting following that of the parent body, passed resolutions looking toward the ultimate disbanding of the association if greater interest was not manifested at the next meeting.

But this is not a condition inherent with the men of our industry, though it shows a most lamentable situation and one which this paper is determined shall not be permitted to go on unchallenged. That the condition is not inherent is perhaps demonstrated by the incident at the Ottawa Beach meeting in which Mr. Scullin of Cleveland was game enough to give voice to his thoughts that the efforts of the standards committee, of which he is a member, were a waste of time and worry because the developments are so rapid that standards established today are obsolete in a few months. The promptness and vigor with which this frank expression was treated by the remainder of the delegates present gave ample proof of the fact that the men of the industry for the most part have not lost their interest in advancement, but need only to be aroused. And it was for this purpose that we sought for publication last week the very frank articles which appeared.

We believe that the action taken by the main body and accountants of the C. E. R. A. dealing with lack of active participation in the association work is indeed a healthy sign. There are only a very few circumstances which should be permitted to stand in the way of attention to association work. Repeated absences are inexcusable, for not only does this hamper the work of the association, and therefore do harm to all member companies by holding back progress, but it robs the individual of a splendidly broadening influence.

Every man owes it to his company to do his full part in association work and no one is too well informed himself but that he can derive new ideas from his fellows.

Can the "Piece Work" System Be Applied to Railway Management?

A VITAL element in the railway industry is efficiency in management, yet it has been found difficult to incorporate in any service-at-cost franchise a method by which this quality will be properly rewarded. As efficiency in operation is best obtained in any industry by the award of inducements rather than penalties, this problem naturally becomes one of offering rewards that will appeal to capital, labor and the public.

What rewards should be given and how can efficiency in management be measured or obtained?

Various methods have been suggested to solve this problem, *i.e.*, the allowance to capital of a return varying inversely according to an agreed ratio with the fare charged, a bonus system for capital based on an artificial standardized bogey consisting of a balancing fund between fixed limits, and a return based on the number of passengers carried. All these plans have faults, yet at least they make an attempt to solve the problem. In the interests of the future of the service-at-cost franchise a solution is desirable. The railway industry is facing a fact and not a theory; the companies need capital to supply the additional service required by an increasing population, yet when the general sentiment of investors is that any one is foolish who invests in railway securities, the need for some means to secure this investment is obvious.

If economic and regulatory conditions should remain constant the problem would be an easy one. It would be necessary only to set a reasonable bogey for the operating ratio and allow a higher return as the performance proved better than the standard set. But no matter how fair such a plan might be when established, changing conditions would make it in time inequitable for one side or the other.

One remedy would be to permit either side to ask for an alteration of the bogey at stated periods, just as standards for piece work in manufacturing may be altered periodically if found to be grossly unjust. Any change of this kind would have to be made with the

greatest fairness, yet this does not seem impossible of fulfillment if certain recognized standards, such as current rates of interest for different classes of securities, are taken into consideration, and perhaps agreed upon in advance. A provision of this kind would at least have obviated such injustice as has been caused to certain companies which accepted so-called service-at-cost franchises only a few years ago when a nickel was a reasonable fare for the average ride and 5 per cent mortgage bonds could be sold at par.

Here is a problem for the expert in railway economics. It may be that we need a Fred W. Taylor to supply the answer. The problem is difficult and differs from that in the manufacturing business, but the fundamental principles are the same, and the methods used in manufacturing which have proved to be practical and workable at least offer prospects of success.

Don't Forget "Safety First"

THE electric railway industry made the slogan "safety first" its own property in the minds of the public until the war arrived to work havoc with normal conditions. The war made "get there first" and not "safety first" the slogan of the nation.

Economic conditions in the railway industry have occupied the attention of the managements since the war —self-preservation is the selfish law of nature—and safety methods were allowed to lapse and grow into a rut. Then, again, a changed operating personnel, different operating conditions, changes in operating equipment and increased use of motor vehicles all put new factors in the safety problem.

The electric railway industry has made a splendid record in safety work. It decreased its death rate per 100,000 inhabitants from 4.37 in 1907 to 2.66 in 1916, as compared to a decrease in rate for the railroads of from 17.84 to 11.50 and an increase in deaths by automobiles from 0.68 to 4.92 for the same period. Such a record, considering the number of passengers carried and the operating conditions for each agency, shows how brilliantly the electric railways were enforcing their safety slogan just before the war.

There is a selfish interest in maintaining safety campaigns and devices. Accidents mean legal battles, insurance claims, damaged public relations and other disagreeable financial and operating conditions that may burden the railway system more than the efforts and money needed to maintain safety standards.

There are burdens, financial and otherwise, associated with high standards of safety. The public and the employees must be educated continuously, for safety campaigns never get results unless maintained with undiminished vigor; new devices must be tried out and purchased to suit changes in conditions and equipment; old safety methods and slogans must be continuously revamped to maintain efficiency and interest; the attitude and intelligence of the employee has changed considerably, as he must be induced, not ordered, to carry out, to him, non-essential policies such as courtesy campaigns and safety-first precautions, but the railway industry cannot afford to backslide on its "safety first" slogan.

In maintaining the lead in national safety movements it is rendering a national aid, gaining a national prestige, gaining public good-will and keeping its earnings intact. It can, with profit, co-operate in any safety drive such as the Lehigh Valley drive, described in the last issue of this magazine, and can render material aid to the American Engineering Standards Committee in its attempt to codify safety methods.

Give the Master Mechanic a Little More "Head"

THE meeting of the equipment men, or Association of Electric Railway Men, at Youngstown, a report of which is given in this issue, is a move in the right direction. We wish there were more of such meetings fostered by parent associations like the C. E. R. A., the Illinois Association and Iowa Association, for there is good reason to believe that practical results of almost inestimable value to the company ultimately are derived from meetings of this sort.

To quote the admonition of "Engineer" in the issue of July 10, "what the railways need to do is to provide the public the sort of rides that the public wants." The master mechanic is in a strategic position to make or unmake strong public sentiment for the company through one of those elements of good service, namely, reliability of its equipment.

Now, there are all sorts of labor-saving devices, there are many methods of handling particular pieces of work and there are numerous shop kinks and other kinds of information which master mechanics can exchange when they get together around a table for informal discussion. An incident was recently related in which one master mechanic found himself entirely without repair parts of a certain kind, while on a connecting road the master mechanic had a surplus of this very thing. But master mechanic No. 1 was not even acquainted with master mechanic No. 2, and as a consequence service on his road was much crippled until sufficient time had passed to obtain parts from a factory. It seems almost inconceivable that such conditions do exist, and the way to eradicate them is to encourage the fullest sort of discussion, accompanied by visits to shops of the various companies with a view of benefiting by the other fellow's experience. It is probable that the smaller roads suffer from this situation more than the larger ones, but all can benefit from the other fellow's experience.

This is not so much a message to the master mechanic as it is to the manager, who ought to study this question carefully. He should do everything within his power to enable his master mechanic to attend meetings, not of managers but of master mechanics. These men are practical men and not only do they talk but they visit each other's plants and exchange first hand information.

We have mentioned this one line of work, but like results can be obtained by meetings of power plant superintendents, maintenance of way engineers and transportation men. Much of the real work of providing transportation is done by these various groups, and while the management which is ultimately responsible on each property tries to give encouragement to every element of its operating personnel, too often, we are afraid, this need of the men of the operating organization getting together with men in similar work on other roads is overlooked. We believe it to be one of the greatest fields of usefulness of local associations to foster such meetings, though not necessarily to make them a part of the program of the parent association meetings.



CHICAGO'S TWO-CAR TRAIN WITH NEW TRAILER AND REMODELED MOTOR CAR

Chicago's Trial Trailer Completed

Forerunner of Two Hundred Weighs 26,000 Lb. and Seats Sixty-two—Design Has Many Interesting Features and General Appearance Is Unusually Attractive

CHICAGO'S trial trailer, a magnificent piece of car design work, for which credit is due H. H. Adams, superintendent of equipment Chicago Surface Lines, and his staff of engineers, is now in daily operation. With its rearranged motor car it is making a morning and afternoon rush-hour round trip on various lines to demonstrate the practicability of trailer operation in general and the features of this particular train under all operating conditions and to acquaint the trainmen and the public of the several sections of the city with the aspects of this character of service.

An earlier story about this trailer, which appeared on page 820 of the April 17 issue of ELECTRIC RAILWAY JOURNAL, noted that a drive to build the car and rearrange the motor car within sixty days was being made. This bogey was made but for a few days, and on June 18 the train made its initial trip, carrying a party of company officials and engineers, city representatives and newspaper men. Since then it has been run about eighty miles a day on the same schedule that is maintained by the single-car units and further complete tests and trials will be made.

On these trial runs a careful watch has been kept of the motor temperatures to determine whether the Pullman cars, equipped with four GE-216, 55-hp. motors, 33-in. wheels and 15/71 gear ratio, could be safely used in the trailer service. The conclusion reached after more than two weeks' operation is that these cars can be used for rush-hour service without dangerous rise in temperature if a layover of three or three and one-half hours can be had between the two trips. The motor car used for the first trailer was equipped with a National A-4, 15-cu.ft. air compressor. This was not changed, and so far it seems to be standing satisfactorily the extra heavy duty imposed by the trailer. Actual temperature readings of the car motors and compressor motor taken in the morning after one round trip on route No. 22, having a mileage of 38.44, and again after the afternoon similar run, with a layover of three and one-half hours between the morning and afternoon runs, showed the following temperature rises:

MAXIMUM RISE ABOVE ATMOSPHERE DEG. C.
(Outside temperature 24 deg. C. in both cases)

		Commutator	Field	Armature
Readings taken when car stopped at 10:38 a.m.	Motor No. 1.....	51	52	53
	Motor No. 3.....	53.5	50	51.5
	Compressor	48		
Readings taken when car stopped at 6:18 p.m.	Motor No. 1.....	55.5	58	60
	Motor No. 3.....	57	55	64.5
	Compressor	37		

The operating practicability of trailers in Chicago from traffic and equipment standpoints has now been pretty well established and the new management of the Chicago Surface Lines is about to take the progressive step of inaugurating trailer operation on a large scale by converting 200 of the Pullman type cars in the manner described below and securing 200 new trailer cars of the design here described, except for changes noted, as soon as the financing can be arranged. The company will probably build about fifty of the trailers, in addition to reconstructing the motor cars in its own shops, and buy the remaining 150 trailers.

PRINCIPAL FEATURES OF TRAILER DESIGN

In general, the trailer is a two-way, center-entrance car measuring 47 ft. 6 in. long, balancing the scale, completely equipped, at exactly 26,000 lb., and seating sixty-two passengers. The body is of arch roof design with a steel underframe and side girder up to the window rail and a wooden superstructure, this combination of steel and wood providing a lighter car than could be built of all steel. The steel portion is made up entirely of standard structural steel sections and plates and weighed when completed 6,260 lb. The body is mounted on Brill 67-F trucks with 22-in. rolled steel wheels and a 4-ft. 4-in. wheelbase. All of the main and many of the detail dimensions of the car body and other information are shown in the accompanying drawings. And the accompanying photographs of the completed car gives

a very good idea of the general design and of the pleasing lines and finish of the car, both inside and out.

In making up the superstructure, the design was so worked out as to eliminate the wooden side sill along the bottom of the side plate, thus saving that weight and avoiding deterioration of the sill. The side posts, which it will be noted are only 2 in. thick at their maximum section and taper off to 1¾ in., are fastened to the steel underframing by means of straps and bolts which clamp them to the side girder plates. Every other post is a pier post and is babbetted to permit the insertion of a ⅝-in. tie rod. A filler strip is glued in place to cover up the rod and fill in the remainder of the groove. These tie rods are bolted to the angle at the bottom of the girder and at the top, through the top side plate. The pier posts are fastened to the side plates by three straps at the top, center and bottom of the girder plates, and the straps are made short so that they can be drawn up tight. The intervening posts are through-bolted to the side plates at the top and middle and fastened with a strap at the bottom of the plate. The carlines are made of wood and those resting on the pier posts are reinforced by 1¾-in x ⅛-in. straps bolted to them and carried over the top of the side posts.

The flooring underneath the seats is built with a single layer of ⅛-in. maple. That in the center well and in the aisles is laid double, the first layer being of ⅝-in. yellow pine with a top layer of ⅝-in. maple boards, grooved in sections 4 in. wide. The floor of the well is level, but there is a ramp of 5¼ in. in 9 ft. each way from the well.

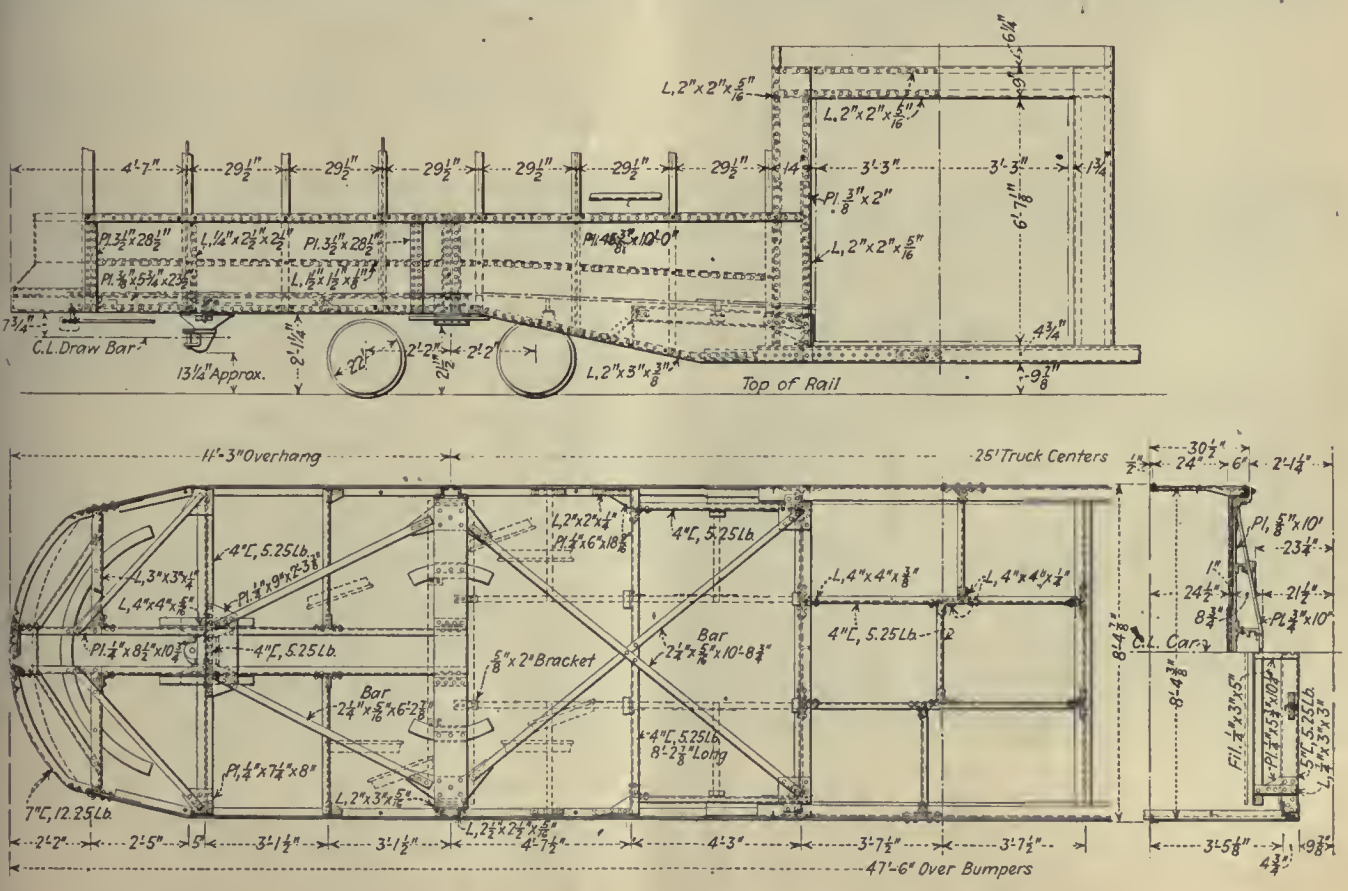
One of the features of the car body construction is the use of hollow brass tubing for the window guards, instead of the heavy wire screen formerly used in Chicago and shown on the motor car in an accompanying picture. This new type of window guard is made up of seven lengths of tubing, supported at the center and ends by brass castings and fastened between the side posts by means of four No. 12 flat-head wooden screws at either end. The brass tubing used is of No. 18 gage brass and has an outside diameter of ⅞ in. The guards are made up in short sections and fastened between the side posts, leaving sufficient clearance inside the outside post line for putting on storm sash without removing the guards. This manner of fastening the window guard in sections between the posts adds materially to the strength of the side construction of the car. Besides adding stiffness to the structure, this type of window guard saves about 100-lb. weight per car; it reduces maintenance, since it does not have to be painted or taken care of in any way, and it can be left on the car permanently winter and summer, since the windows can be readily washed through the guard. The weight of each section of the guard is 4¼ lb.

Interior Finish Attractive

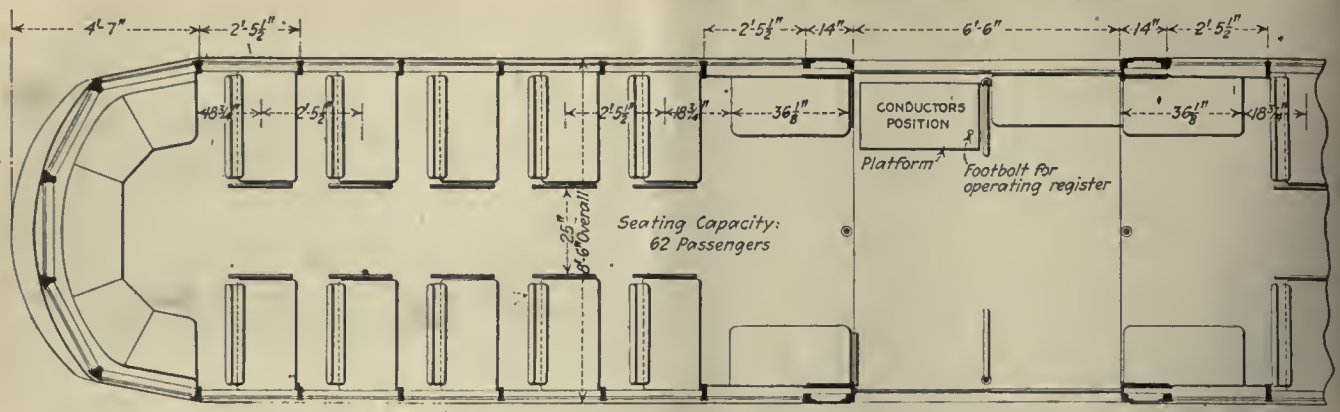
Agasote head lining, painted a very light buff, and a cherry finish of the interior woodwork, together with the installation of all molding in unbroken straight lines from one end of the car to the other, give the car interior an unusually clean, plain, attractive appearance.

The windows are made with wood sash with a brass channel at the sides and are so designed that it is not necessary to remove the sash from the cars in summer, since these are very light. Only one O. M. Edwards lock and rack is used per sash, the opposite side of the sash being equipped with an Edwards sash brake, which prevents the sash from falling all the way down.

The curtains are also installed in a manner which bears comment. These are made of a double-faced



PLAN AND ELEVATION OF CHICAGO TRAILER STEEL FRAME



FLOOR PLAN SHOWING SEATING AND LOADING WELL ARRANGEMENT

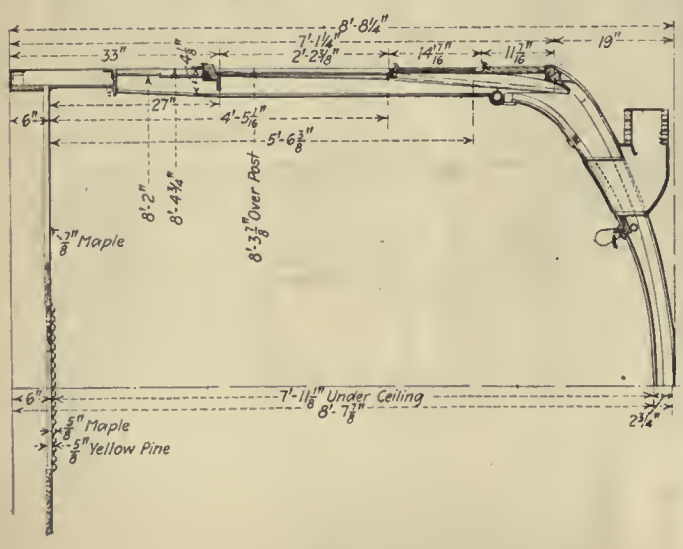
material supplied by the O. Bannon Company, and the rollers are mounted so that they are entirely exposed, the ends of the rollers and fixtures being covered up with a small curved brass plate. With the full curtain exposed in this manner, it is possible to clean both sides at the same time by wiping the roll and the inner side of the curtain as it is pulled down.

The cross seats are of the form fit springless type, rattan covered. The weight of the seat is 57 lb. complete, which, incidentally, is 18 lb. per seat lighter than the spring cross seat in the motor car. The rattan on the backs of the seats at the end of the car and those longitudinal seats adjacent to the loading well are carried only part way down to the cushions, thus saving rattan and at the same time making the seats more comfortable.

Ventilation is provided by means of twelve Railway Utility ventilators, there being four exhaust ventilators and two intake ventilators on each side of the car. This provides the same system of ventilation, making use of a compensated intake, that is employed on all of the motor cars of the Chicago Surface Lines.

Arrangement of Loading Well

The loading well has been arranged with the idea of obtaining the maximum reservoir capacity for boarding passengers. Entrance or exit is made through either of two wide sliding air-operated doors, except only as entrance is blocked by the egress of passengers. The conductor's position is placed at the opposite side of the well from the entrance doors and a platform 6 in. high is provided for him to stand upon, thus giving him a position elevated above the passengers and affording him full control. A seat or stool is made an integral part of this platform and as the direction of the car is reversed this platform is moved to the diagonally opposite position in the well. The register is mounted over the door and is operated by a foot pedal extending down through the conductor's platform and through the floor. When the platform is moved to the opposite position the register is operated in the same manner without moving it. Both positions of the conductor's register pedal engage with the same operating mechanism. The control levers for the doors are installed just above the stanchion beside the conductor and the push button for the single stroke bell signal system is mounted on the under side of this stanchion just below the door-operating levers. A duplicate push button for the bell signal system is installed in either stanchion, the stanchion being fastened permanently in place, but the door-operating levers are transferred from one to the other when the direction of the car is reversed. The four doors in the car are operated by four separate engines which are installed above the floor underneath the longitudinal seats.



CROSS SECTION OF TRAILER, SHOWING CONSTRUCTION OF SUPERSTRUCTURE

In addition to the simple stanchion beside the conductor, there is also a vertical stanchion in the center of the aisle on either side of the well. A chain is swung across to the small bulkhead and this chain is swung to the opposite side with a reversal of direction.

This arrangement of the stanchions in the loading well and the arrangement in the motor car, described below, is based on the theory that the public has been educated to the prepayment system of fare collection and that therefore dependence does not have to be placed so completely upon rails now as was formerly necessary. The platform design at this time is therefore made from the point of view that the public is educated and that the primary object is to get the passengers into the car as soon as possible, to close the doors and then to collect the fares. Consequently it is not thought advisable to adhere too rigidly to the old scheme of complete separation of boarding and alighting passengers.

The most frequent condition encountered at a stop is either a heavy loading or heavy unloading. The number of points at which there are both heavy loading and unloading are few, and in most cases the public has become so accustomed to separate lines of travel for ingress and egress that the boarding passengers automatically give way to the alighting passengers, but when

the latter are all off the former pour in at all points and make the loading extremely rapid.

The doors of the Chicago trailer have been equipped with electric door interlock control, and the motor car is likewise equipped, so that the motorman receives the go-ahead signal at the instant the doors are closed. The conductor is given control of the train in case of emergency by an emergency valve which is installed convenient to his position. A hand brake is provided for holding the car when detached from a motor car and this is installed adjacent to the vertical stanchion at one side of the well and so designed that it requires no support above the car floor. It is equipped with a drop handle and a heavy staff which is supported at two points below the floor. The ordinary service braking of the trailer is done by two 7-in. brake cylinders, located one on either side of the well. It is found that less weight is involved by installing two brake cylinders than to install one cylinder with the necessary connecting rods. The double-cylinder arrangement also avoids the necessity of having a rod extend underneath the well where the clearance is small.

Both motor car and trailer are equipped with two Tomlinson automatic couplers, with which the electric jumper for the light, signal and heater circuits is ingeniously combined. The electric coupler consists of a four-point socket fastened on one side of each car coupler by means of a special iron bracket bolted to the coupler. The jumper, with plugs attached to either end, is connected across underneath the coupler to the two sockets. The complete jumper with plugs is only 28 in. long. It carries five wires, two of which are connected together to carry the heater current. The neat appearance of this jumper arrangement may be seen at the extreme right of the accompanying straight side view of the trailer.

Reduction in Weight Possible

In planning the trailer, a weight of 24,000 lb. was set as the goal, and this will undoubtedly be attained in building additional cars. In building this first car



EXTERIOR OF REMODELED MOTOR CAR

time was an important factor, and when delivery of materials of just the desired kind could not be obtained soon enough it was necessary to resort to materials on hand as a substitute. For example, the side girders were made of No. 12 gage steel instead of No. 13, some angles and channels used in the underframe were heavier than was wanted, built-up type bolsters instead of cast-steel bolsters were used and the trucks are somewhat heavier, it is believed, than they will be when there is time for them to be built after the company's specifications. These factors should decrease materially the final weight.

There will also presumably be an opportunity to reduce the weight at least 1,500 lb. on future cars by making them one-way instead of two-way cars. On this trial car, in view of various considerations, it was thought advisable to make it a two-way type, but it is now practically decided that the one-way type will meet traffic requirements equally as well and will make possible several advantages from the standpoint of equipment design.

The present weight of 26,000 lb. is 419.35 lb. per seated passenger and the 24,000 lb. weight if attained



VIEWS OF THE FINISHED TRAILER FOR CHICAGO

Nos. 1 and 2—Views of Chicago's trial trailer. Note neat jumper connection at extreme right of the picture at the bottom.

No. 3—The well arrangement and the pleasing interior finish are well protected in this picture. New devices are mounted in sight inside the car.

No. 4—Interior of the remodeled motor car, showing the addition of folding doors and steps, the new position for the conductor and the prepayment rail arrangement and two folding seats on the platform.

No. 5—View of the center well as seen from outside the car.

would give 387 lb. per seated passenger. The weight of the present car is distributed as follows:

Body complete with couplers and fenders	17,950 lb.
Steel framing complete	6,260 lb.
Superstructure	9,580 lb.
Trucks with wheels and axles	8,050 lb.
Couplers and electric jumpers and fenders	2,110 lb.

RECONSTRUCTION OF THE MOTOR CAR FOR TRAILER OPERATION

Several changes in the interior arrangement of the motor car were made in preparation for trailer car operation. In the first place, the open rear platforms are closed up with air-operated folding doors. The bulkheads are removed for the purpose of increasing the seating capacity and of facilitating the loading and unloading of passengers through the provision of a larger reservoir capacity. With the bulkheads removed, the conductor's position is changed from the platform up onto the car floor, which is made to project out on to the platform beyond the end sill a distance of 10 in. This brings the conductor forward and in an elevated position, so that he can see the steps over the heads of the passengers and collect fares from the platform as the passengers pass on either side of him. This arrangement not only gives the conductor good supervision of passengers but provides an ample passageway on either side of his position for passengers to enter or leave the car body. Only the simplest kind of stanchion is provided, as seen in an accompanying photograph, dependence being placed on the theory that passengers are already educated to the prepayment plan, as noted in connection with the trailers.

With the bulkhead removed, it is possible to remove the sand boxes and combine them with the end longitudinal seats and move the longitudinal seats at the end of the car body toward the ends of the car a sufficient amount to permit of the installation of an additional cross seat on either side of the car at both ends. Furthermore, two folding platform seats are installed, providing a seat for six additional passengers. By these additions, the seating capacity of the motor car is increased from forty to fifty-four. At the same time, the addition of couplers and the other rearrangements bring the weight of the car from 53,440 lb. up to 55,400 lb. This brings the total seating capacity of the train up to 116.

More Economy in Operation

LOWER cost is an important item and any reduction, other things remaining equal, is welcome. The purchase of power-saving devices and recorders does not necessarily mean a reduction in power consumption of street railways, and in any event the employees must be instructed in their use and induced to follow directions. M. F. Skouden, superintendent of motor power, in a recent issue of the company paper, asks the trainmen of the Indiana Traction Company to improve their records and tells how to get results from power-saving meters.

Every such device requires intelligent use and an educational campaign is an essential element in its success. In order to afford an inducement for better operation some companies offer cash prizes for the men making the best monthly records. Such prizes, however, must be used with care to avoid slowing down schedules, or causing jealousies and labor trouble, as routes, hours or traffic conditions differ.

One-Man Cars Used in New York

Second Avenue Railroad Making a Trial of Some Remodeled One-Man, Two-Man Cars for Its Service, with Marked Success

THE Second Avenue Railroad has remodeled five of its closed passenger cars for one-man operation. This work was done in its shops and additional cars are being remodeled for this service as rapidly as possible. These cars are equipped with maximum-traction trucks, hence have two motors each. The cars weigh 12½ tons and seat thirty-six passengers.

The changes made for this service consist in the addition of folding doors and steps to both sides at each end, together with the necessary operating apparatus and air brake equipment. The folding doors and steps are hand-operated, arrangements being made for the use of operating levers at two locations on each platform. One of these is just to the right of the motorman's brake valve and is used by the operator in one-man operation. The other location is on the right side of the front platform and left-hand side of the rear platform next to the bulkhead. This latter operating lever connects with the

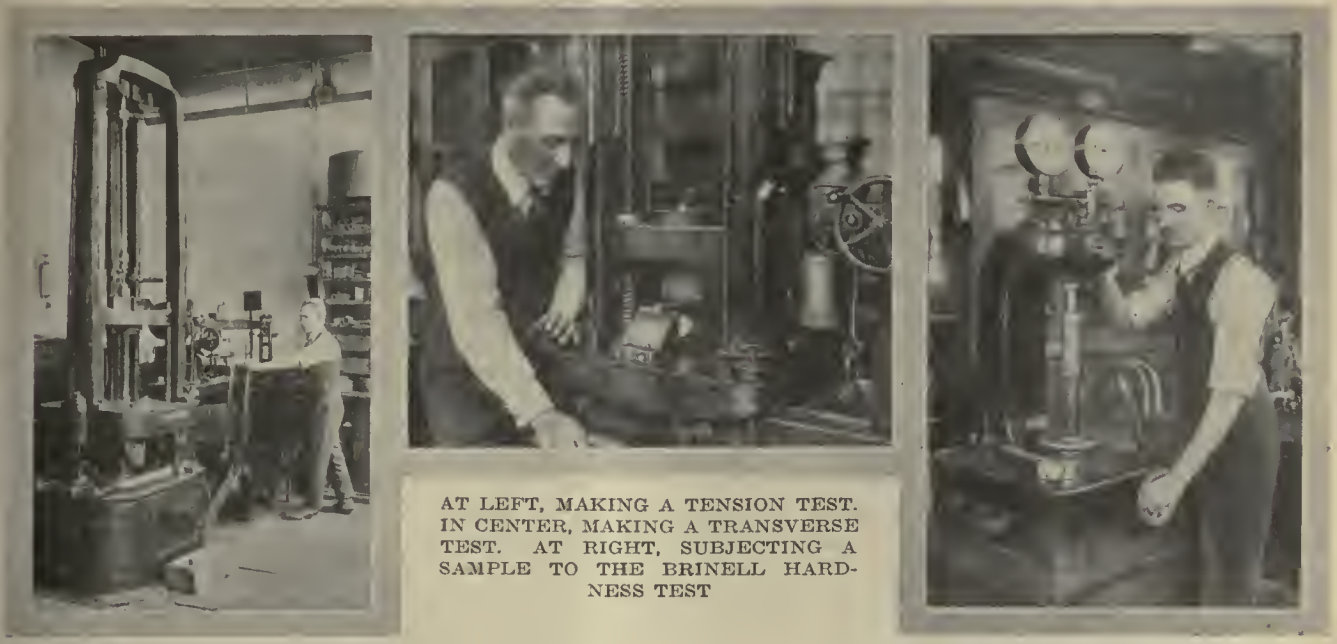


CAR REMODELED FOR ONE-MAN, TWO-MAN OPERATION IN NEW YORK CITY

rear right-hand door and is used by the conductor when two men per car are necessary. The right-hand front doors, which would be used for one-man operation, are operated from the position just to the right of the motorman's brake valve.

An accompanying illustration shows one of the cars as remodeled and now in service. On some of the cars which are now being remodeled some changes from this construction are being made. Among these is the use of a stationary panel about 15 in. in width extending back from the front of the platform. The doors and steps are moved to the rear a corresponding distance. The advantages of this arrangement are, first, to provide a space for the motorman which will not be invaded by passengers boarding and alighting; second, by moving the steps back from the front buffer, danger of damage from bumping of trucks or heavy vehicles is done away with. These cars are required to operate in extremely heavy traffic sections and considerable damage results from having the steps too close to the buffer, because whenever a vehicle is struck it either slides back and strikes the step mechanism, thus putting it out of commission, or if the front end is damaged the whole step and door mechanism is rendered useless.

These changes have been carried out at the direction of C. E. Chalmers, receiver for the railroad, and he states that the operation is proving popular both with the traveling public and the men who operate the cars as well.



AT LEFT, MAKING A TENSION TEST. IN CENTER, MAKING A TRANSVERSE TEST. AT RIGHT, SUBJECTING A SAMPLE TO THE BRINELL HARDNESS TEST

Railway Car Materials — Steel III

A Description of Special Tests that Are Used in Determining Car Material Qualities, Together with Heat Treatment and Alloys Used

BY NORMAN LITCHFIELD

Physical and Chemical Properties Closely Connected

IN ADDITION to the usual tests for steel which were outlined in a preceding article certain special tests have been developed in the past few years which will be described briefly, as they enter but slightly into the realm of car materials.

The first of these is the Brinell test for measuring hardness, in which a hardened steel ball is forced under pressure against the piece to be tested, forming a depression in the latter. This depression is measured and the corresponding "hardness numeral" found from a table. A more or less definite relation exists between the numeral and the tensile strength and hence the test is useful in determining the strength as well as the hardness of the metal in an object which cannot be cut up for tensile test. Manufacturers of gears have used this method for checking up the character of the material in gears and pinions. It is a test, however, quite apart and distinct from the ordinary tensile tests and its use is hardly justified except in special cases.

Another instrument used to measure hardness is the scleroscope, in which a small steel hammer, diamond pointed, drops in a glass tube against the surface of the material to be measured. The hammer rebounds up the tube, the height of the rebound depending upon how much the diamond point penetrates the material—the softer the material the greater the penetration and the less the rebound. The tube bears a graduated scale, 100 being the point to which the hammer rebounds on hardened carbon steel. This highly rigorous test is somewhat special in nature and is not in general use in the realm of electric railway materials. Among the places where it is used is in the measurement of the relative hardness of carbon motor brushes. All of the foregoing tests relate to the strength of the material under steady loads. Experience has demonstrated the fact that metal which shows up all right under the usual tension and bending tests will fail in service where it is subjected to shock, vibration or reversal of stress, and much study has been given to developing a laboratory test which will show the ability of the metal to resist these dynamic stresses.

Impact tests have been devised in which the test specimen is bent back and forward until rupture occurs. Others which are obtaining considerable favor are based on the principle of a swinging hammer falling in the arc of a circle from a given height against the specimen at the bottom of its swing, rupturing the specimen, and continuing upward in its circular path. The distance the hammer continues after breaking the specimen is measured, this being in some measure proportional to the resistance of the material to shock.

For the "reversal of stress" test or "fatigue" test the specimen is loaded with a weight sufficient to produce the desired stress and rotated, the number of revolutions to rupture being recorded.

Lastly, as a means of determining the nature of the metal, we have the micro-photograph. In this a small piece of the material is highly polished, etched and photographed through a microscope, at any desired degree of magnification, that recommended by the American Society of Testing Materials being one hundred diameters. The study of the character of materials by use of the microscope and the micro-photograph has developed into a science in itself, and the

microphotograph, or "micrograph," can only be used safely in judging of a material by one who is expert in that science. The railway engineer however, can, and to some extent does, use the micrograph to show the fineness or closeness of grain of the metal in cases where it is desirable to know this feature.

We have now carried the reader, in outline fashion, through the processes of production of the material and the ordinary methods of testing the finished product. Further discussion of the refinements of testing does not seem warranted in the limits of these articles, which are intended principally to point the path to those in the railway field who desire more knowledge of the materials they are constantly using.

We may therefore pass to the consideration of some special phases. One matter of general interest is that of how far the user should go in specifying the details of the manufacturing process which are or are not to be used. Some of them are quite generally used and are accepted by the manufacturers without comment. Such is the specifying by what process the steel must be made, whether open hearth, bessemer, crucible, etc. On the other hand, when we come to such a matter as discard, *i.e.*, the amount of the ingot which is to be cut off and not used, we enter a realm which is more or less in dispute. The purpose of the discard is to eliminate piping and segregation as far as possible and some ingots will require more discard than others. It therefore seems fairer, in specifications where it is desirable to guard against piping, to provide simply that sufficient discard must be made to prevent undue piping and leave the actual amount a matter for arbitration between the inspector and the mill.

Avoid Non-Essential Requirements

Somewhat analogous is the listing of definite limits for tensile properties in a specification, and the inclusion therewith of equally definite limits for the chemical composition. As we have previously pointed out, the physical properties and chemical composition travel, as it were, hand in hand, and to specify both is about like applying an overhead check rein to a horse pulling a heavy load up hill. The steel producer in such cases inevitably will kick much like the horse. It is perfectly fair of course to ask for limits to the impurities, such as phosphorus and sulphur, besides the required physical properties, but when it is attempted to require exact carbon and manganese contents besides the tensile requirements it becomes unreasonable. It seems only fair that the user should determine in his own mind what is the important feature for his purposes, the chemical composition or the tensile strength. Thus if he proposes to use the steel for some welding purpose he would naturally desire to limit the carbon content and he would be satisfied with a general knowledge of the tensile strength. On the other hand, if he purposes using the steel in a part where the working stress must of necessity run high he would require an exact knowledge of the tensile strength and be but little interested in the chemical composition. It should be remembered that too great particularity in such matters is reflected in the price of the material, for the minute any specification requires a class of material which cannot be produced regularly and commercially, but which necessitates the selection of heats, etc., the steel maker naturally has to be reimbursed for the extra labor and the upsetting of his production schedule. So the wise man will reflect whether all the provisions of his specification are entirely necessary before insisting on their fulfillment. Not but that there are cases when it pays to be particular; in such cases one must prepare to pay.

The demand for a greater strength than can be obtained with ordinary carbon steel led to two practices, one the subjecting of finished carbon steel to certain temperature conditions known as "heat treatment," the other the addition in the manufacture of the steel of certain other metals which have been found to raise the physical properties. Both of these matters obtained their original impetus in connection with the manufacture of tool steel, armor plate and projectiles, and later still greater strides were made and are still being made in connection with automobiles and aircraft. Other than for tool steel, the first introduction of heat treatment in its scientific phase into railway materials was in connection with gears and pinions, of which the life and the freedom from breakage were enormously increased with the introduction of these materials. Another field is that of axles and armature shafts. For many years it has been the custom to anneal passenger car axles after forging to relieve forging strains. This was done, as a general rule, by burying them when hot in dry ashes. While this relieved the strains and to some extent refined the grain of the metal it could hardly be called heat treatment in the present acceptance of the term.

The phrase "heat treatment" is one which has been very loosely used and may be said to have often covered a multitude of sins. Strictly speaking, it is any process of reheating to which a piece of steel may be put in order to alter its physical properties in some way.

A rough approximation of the various conditions of steel at different temperatures may be given somewhat as follows: As every one is familiar, steel, when subjected to a sufficiently intense heat, finally passes into a molten or liquid condition. Somewhat below this temperature there comes an actual separation of the grains of the steel. It is at that point that, if allowed to cool normally, the steel is in the condition, familiar to forge men, known as "burned" or overheated, and in this condition it cannot be restored to its normal state except by remelting. By cooling the steel again below this point there comes a state where there is a "remarkable development of sensible heat, causing the color to brighten up again, this phenomenon being known as recalescence" (the language being that of Prof. Johnson). The temperature at which this occurs is known as the critical temperature, this varying somewhat with the composition of the steel. Or, as is expressed by another authority, "critical temperatures are temperatures at which retardation occurs in the heating and cooling curves of iron and steel."

Between the critical temperature and that which approaches the "burned" conditions, before mentioned, there comes a change in the grain structure of the steel, the grains becoming larger and larger and the steel harder. It is these changes, their control and interpretation that form the field of that interesting but complex science known as metallography which has received so much attention the past few years.

In the fabrication of the article, whether it be axle, gear or other forging, it often happens that the forging process or the cooling, or some other factor, disarranges the normal condition of the steel so that it is not in its best condition for use to resist strain or shock. Recourse is had therefore to some form of heat treatment to put the steel in a proper condition. This may

be a simple "normalizing," which consists simply in heating the steel to the critical temperature and cooling slowly in the air. This is a more or less approximate process and may or may not give definite results.

For definite results we must go to a more carefully controlled process, that now known technically as "annealing." The American Society for Testing Materials has formulated a recommended practice for annealing, under the serial designation A-35-11. In this it is stated: "The usual purpose in annealing is to remove existing coarseness of grain. This removal is brought about by heating the object to an annealing temperature, which varies with the carbon content of the metal. But the rate at which the object cools from this annealing temperature influences its properties very profoundly. Hence this rate of cooling should be suited to the duties which the object has to perform in service, and hence to the properties which we seek to give it. Under certain special conditions an annealing is required in order to remove, not coarseness of grain, but the effects of rolling or otherwise working the metal at a temperature so low as to set up serious internal stress." The specifications then proceed to outline the method of heating and the control of the temperature.

The following ranges of temperature should be used for the several ranges of carbon content indicated:

Range of Carbon Content	Range of Annealing Temperature
Less than 0.12 per cent	875 to 925 deg. C. (1,607-1,697 deg. F.)
0.12 to 0.29 per cent	840 to 870 deg. C. (1,544-1,598 deg. F.)
0.30 to 0.49 per cent	815 to 840 deg. C. (1,499-1,544 deg. F.)
0.50 to 1.00 per cent	790 to 815 deg. C. (1,454-1,499 deg. F.)

Attention is then called to the effect of different rates of cooling: "After the object has been held at the annealing temperature long enough to make its temperature nearly uniform throughout and to complete the refining of the grain it should be cooled in a way suited to its carbon content and to give it the specific properties needed. The general principles are, first, the higher the carbon the slower should be the cooling, and, second, the slower the cooling the softer and more ductile the metal will be and the lower will be its tensile strength, elastic limit and yield point. The greatest softness and ductility are obtained at a certain sacrifice of strength and elasticity and the greatest strength and elasticity at a certain sacrifice of softness."

It should be remembered throughout that all of these changes take place without any change in the total carbon and iron content of the steel, but are brought about solely through the alteration of the conditions in which the carbon exists in the steel, it being further remembered that the heating above the critical temperature coarsened the grain and hardened the steel. Hence it is natural to find that by cooling the steel slowly sufficient time is given the elements to rearrange themselves so as to put the steel in its most normal soft condition.

The specifications then point out that to give great tensile strength and high elastic limit, even at a certain sacrifice of ductility, the cooling should be more rapid, and "to give an unusually high combination of ductility with tensile strength and elastic limit, recourse should be had to water or oil quenching and annealing."

This process is often known as "quenching and tempering," this term in fact being used in the A. E. R. E. A. standard specification Et 9b, for "Quenched and Tempered Carbon Steel Axles, Shafts and Similar Forgings," which in a modified form has become an A. S. T. M. standard, serial A 19-18.

It was this particular form of heat treatment which became first known generally to the electric railway industry, and hence, to some minds, the phrase "heat treatment" always means "quenching and tempering," although, as already pointed out, the latter is but one form of heat treatment. Not only is it but one form, it also is perhaps the most difficult, the specifications going on to say: "This process needs great care and intelligence and should in general be used only by those familiar with high grade steels."

The first step of the process is similar to the annealing already described, *i.e.*, the object is thoroughly heated to the annealing temperature correct for the given carbon content. It is then removed from the furnace and quickly, without delay, plunged into a bath of either oil or water. There is much discussion in regard to the relative merits of oil and water quenching, but it is generally argued that good results can be obtained either way with some characters of steel and shapes. The A. S. T. M. specification states: "It may be quenched in water if its carbon content is so low and its shape so simple that it is not in danger of cracking or receiving permanently harmful stress.

Annealing Must Be Done Slowly

In this condition (after being quenched) the steel is very hard and practically unfit for use without further treatment. As has already been explained, the heating of the steel above the "critical" temperature changes the grain structure, making it very coarse and the steel very hard. Now if allowed to cool very slowly, as in the regular annealing process, the crystalline structure gradually rearranges itself, the grains becoming finer and finer and the steel softer. This all takes time and annealing must therefore be done slowly. But if instead of allowing plenty of time the object, after attaining the annealing temperature, is suddenly plunged in a relatively cold bath, the effect is to hold the coarse crystallized structure peculiar to the region of the annealing temperature. It is as if it were frozen that way.

To put the steel now in a condition that it can be used with desirable values of tensile strength, elastic limit and elongation it must be annealed or "tempered." This tempering is done by reheating, the final temperature being considerably less than the so-called "annealing" temperature to which the object was heated before quenching. Thus, for instance, the "Range of Annealing Temperature" given in the table is from 1,454 deg. F. to 1,697 deg. F., while the tempering range is from 932 deg. F. to 1,382 deg. F. In general, the higher the temperature the more ductile will the steel become and the lower will be its strength and elastic limit. The object should be held at this second annealing or tempering temperature long enough not only to allow its interior to reach it but also to relieve the stress given in the water or oil quenching.

By this process the ultimate strength of carbon steel may be raised from a value untreated of say 60,000 lb. per square inch to as high as 85,000 lb. or 90,000 lb. per square inch and still maintain good ductility, say 20 per cent in 2 in. The ultimate strength obtained depends on the size of the section.

Another phase, or rather application, of heat treatment is that given to case-hardened steel objects, such as railway motor gears, which have the teeth case hardened to resist wear. The A. S. T. M. has developed a "Recommended Practice" for such treatment, Serial No. A 37-14, which is given after the regular case-harden-

ing process has been completed. This is a quench and temper treatment and is one which requires very expert handling.

ALLOY STEELS COMING INTO FAVOR

All of the foregoing has dealt primarily with ordinary carbon steel, *i.e.*, steel whose characteristics are dominated by the percentage of carbon present, whatever other elements there are represented being in such small quantities that they are not controlling, these elements being chiefly manganese and silicon, in addition to the ever-present phosphorus and sulphur, the two latter generally being considered as impurities.

There are certain other metals which when added to the steel materially increase the physical properties and refine the grain. From a structural standpoint the most useful of these is nickel, which is used generally in quantities of about 3 per cent. One advantageous property of nickel is that it does not tend to collect in separate crystals in the steel, as is the tendency of carbon, but forms a true chemical solution with the iron. Quenched and tempered nickel steel forgings will have an ultimate tensile strength as high as 100,000 lb. per square inch in the elastic limit of 65,000-70,000.

Just how much the use of nickel steel has come into favor in electric railway materials is somewhat of a question. To some extent it has been used for axles and possibly for armature shafts. On foreign railways it is extensively used for the screw couplings between cars which are common in European practice in the place of our automatic couplers.

A second element used as an alloy is chromium, which is somewhat similar to nickel and is often used with it, the steel then being known as chrome-nickel steel. Such a steel in objects of proper section can be made by heat treatment to produce extraordinarily high physical properties, some motor gears of the material having shown an elastic limit of more than 100,000 lb. per square inch, with an equally high elastic ductility.

It is, however, felt to be a very difficult material to handle properly and as yet has had but little use in the railway field, other than in some tool steels.

Vanadium is also being largely used as an alloy, sometimes by itself and sometimes with chromium, either in carbon steel or nickel steel. Both chromium and vanadium raise the elastic ratio, *i.e.*, the elastic limit is raised proportionately more than the tensile strength. Inasmuch as laboratory tests of resistance to shock and endurance under repeated or alternating stresses indicate that, for a given working stress, the higher the elastic limit the greater the endurance obtained, chrome and vanadium steels are in large use in places where the dimensions of a part exposed to shock must necessarily be small, as in the automotive industry.

Much interest has been aroused by the development of an ultra-lightweight gasoline-propelled car which is now in course of construction and which it is understood embodies in its construction a considerable amount of alloy steel. Such an experiment is of undoubted value and may point the right way to a more extended use of alloy steels in the electric railway fields.

Another metallic element used as an alloy is manganese, which is added in amounts of about 10 or 12 per cent. It is used in places where great resistance to wear is required, notably in track special work and on curve rails in places of highly congested traffic. For some time a certain make of cast gear made from manganese steel was popular, but while showing great resistance to wear it proved exceedingly brittle and its use was, we believe, altogether abandoned in railway service.

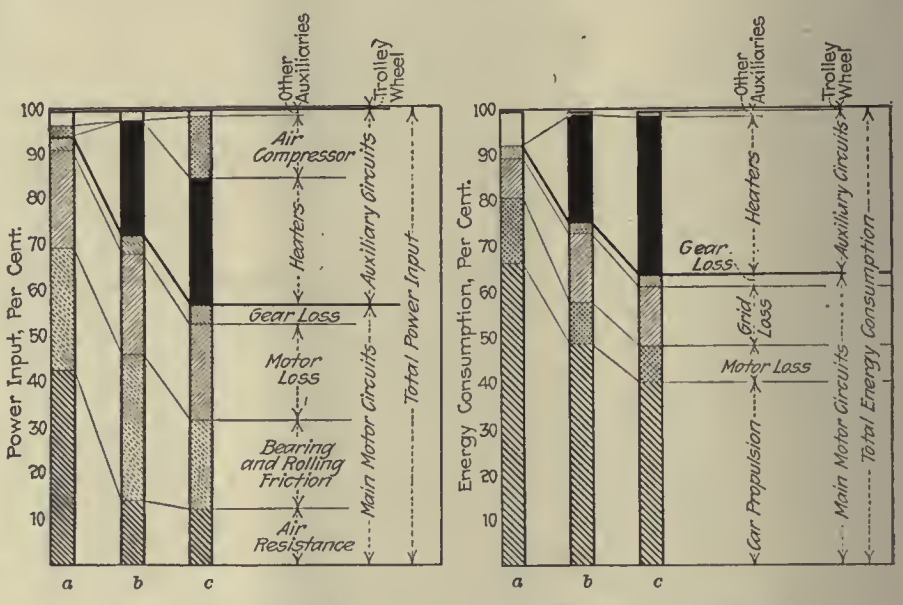
The foregoing are the more ordinary alloys that are met with; other and more unusual elements as alloys being tungsten, tantalum and molybdenum, entering into the composition of some tool steels and to a certain extent in rails.

No more interesting subject exists than that of the manufacture and use of steel in its widely varying modifications, and it is hoped that the foregoing series of articles may be of interest to electric railway men and stimulate further interest in the study of the subject which is of so great importance.

Car Losses Graphically Presented

AT the annual meeting of the Central Electric Railway Association, held at Louisville, Ky., March 11, a paper on "Economical Use of Energy for Car Purposes" was read by D. D. Ewing, professor of electric railway engineering Purdue University. It was abstracted in the issue of this paper for March 27, page 641.

In connection with this paper Professor Ewing prepared charts which show graphically the relations of the data presented previously in tabular form. These charts are reproduced herewith. They show respectively the sub-division of the power input to a car and the subdivision of the energy consumption among the several elements of loss and useful work. These distributions differ because the several parts of the equipment which consume power operate for different lengths of time.



Power Distribution Chart — Energy Distribution Chart

WHAT THE CAR DOES WITH ITS SHARE OF THE POWER PLANT OUTPUT

a—Suburban car. *b*—14-ton city car. *c*—Birney car.

Ohio-Pennsylvania-West Virginia Equipment Men Exchange Experience

An Informal Round-Table Discussion Brings Out the Best Methods to Be Followed in Many Detail Maintenance Practices—Many Points of Value to Electric Railway Equipment Men Are Emphasized

ON JUNE 9, at the Ohio Hotel, Youngstown, Ohio, a group of thirty railway equipment men and manufacturers' representatives from Ohio and Pennsylvania met for the fifth time for a round-table discussion and interchange of experience on the problems and practices of maintaining rolling stock. The group is loosely organized as the Association of Electric Railway Men and it had its inception three years ago, when the Westinghouse Electric & Manufacturing Company called the equipment men of these two States to Pittsburgh for a conference on ways and means to cope with the serious troubles all were experiencing as a result of the very severe winter. The benefits of such a conference were at once apparent and some one moved that the group be made into a permanent organization and that it meet regularly. The association resulted and officers were elected.

At this fifth meeting the president, Daniel Durie, superintendent of equipment West Penn Railways, could not be present, and the secretary, F. G. Hickling, Westinghouse company, Pittsburgh, asked Rufus Moses, assistant general superintendent Youngstown Municipal Railway, to preside. A set of twenty-five questions had been prepared in advance to organize the discussion and the men exchanged experiences and opinions back and forth across the table without restraint. A luncheon at the hotel and a chicken and waffle dinner at New Springfield in the evening helped to make the meeting enjoyable. Those present were H. P. Meyer, New Brighton, Pa.; M. M. Chalfant, Butler, Pa.; P. J. Wood, Erie, Pa.; W. R. Goodnight, Elyria, Ohio; C. D. Smith, O. R. Hill, Carl Knittle, J. B. Stewart, Rufus Moses, A. B. Creelman, A. D. Brackett and F. C. Gething from Youngstown, Ohio; C. W. Folwell, Parkersburg, W. Va.; P. J. Barron, Meadville, Pa.; J. A. Rogan and R. S. Bull, Pittsburgh; Walter Goodenough, Mansfield, Ohio; F. C. Martin, Wheeling, W. Va.; S. F. Witt, Connellsville, Pa.; A. A. Crawford and H. A. Rhoades, Leetonia, Ohio; J. M. Pneuman, F. W. McClosky, W. M. Hutchinson, C. S. Doddleson, W. D. Parker and F. G. Hickling, Westinghouse Electric & Manufacturing Company; W. M. C. Horner, Westinghouse Air Brake Company, and Mr. Dagan, Universal Lubricating Company.

The Best Way to Remove Old Paint

The first matter brought up for discussion had to do with the cheapest and most satisfactory method of removing paint from car bodies. Some of the men seemed to be having good success with the old method of using a blow torch and burning the paint off, while others had had better success with some kind of varnish remover. Those using the remover had varying success. Some were able to remove the paint down to the wood by this method, while others had success only in removing the outer coating. Several kinds of varnish remover were in use and the Pittsburgh Railways was having good success with a solution of wood alcohol, benzol, camphor and nitric acid. The discussion developed no method that stood out as best or cheapest. All were agreed that the sand blast was the best method of removing paint from steel cars, for it not only removed the paint but took off the rusty spots and did the job quickly and cheaply.

In discussing methods for reducing the expenditures for incandescent lamps there seemed to prevail a general opinion that cars are overlighted. On different properties it was brought out that the number of lamps used in a car varied from one circuit of 94-watt lamps to six circuits of 23-watt lamps. One master mechanic testified that his company had to replace 100 lamps for every 10,000 car-miles operated. These were of the 23-watt size. It was pointed out that bad track has a strong influence on the life of lamps and that the life is better when the lamps are not suspended at an angle to the vertical. The consensus of opinion seemed to be that the cost of lamp replacements could be cut down by using larger wattage lamps and fewer circuits. The advantage of standardizing on one size of lamp on a property was spoken of as helpful. One master mechanic pointed out that it was cheaper to use carbon lamps in carhouse and shop pits because of their greater ruggedness.

Safety Cars Discussed from All Angles

While a number of the equipment men present showed a strong tendency to "knock" the safety car because of its "extreme light weight and consequent costly maintenance," there were a few who were ready to acknowledge that the criticism was attributable mainly to the earlier safety cars built and that the weaknesses which had developed in these first cars had been largely overcome and that the maintenance characteristics were very satisfactory. Many of the men argued for the strengthening of the vestibule and platform framing to better withstand collisions with automobiles and motor trucks. Ball bearing armature and axle bearings were given an indorsement by Mr. Goodnight, Cleveland, Southwestern & Columbus Railway, when he stated that his company had been operating two cars weighing only 11,500 lb. and fully equipped with ball bearings for thirty months without any trouble. In fact the bearings had never been opened up for the second greasing until just recently. The safety cars were also discussed from the transportation, financial and nearly every other angle in addition to the maintenance of them.

Mr. Hill, Youngstown, Ohio, told of several alterations in the safety cars in use by his company which have tended to reduce maintenance costs. Ordinarily the hand-brake staff is braced from the bumper channel, and every bump which affects the bumper channel bends the brake staff and makes it inoperative. The likelihood of damage to the brake staff in small collisions has been

largely overcome by bracing the staff from the rear and disconnecting it from the bumper channel. A saving has likewise been realized from replacing the single steel sheet forming the dash by three separate sheets. Also, the buffer sheet has been made a separate piece and put on over the dash. The bumper channel was extended out slightly to the side to protect the doors in a collision. A 30-in. section of the same channel as used in the bumper was placed on the bottom of the bumper as a kind of anti-climber.

Mr. Wood, Buffalo & Lake Erie Railway, told how a very satisfactory economy has been realized in connection with the reclaiming of steel wheels with flanges worn thin. In order to restore the proper flange contour after a steel wheel has been in service long enough so that the flange has worn to the limit, it is often necessary to turn the tread of the wheel down an amount which is equivalent to perhaps 50,000 miles of travel. This mileage is almost completely saved by building up the flange by means of an electric welder to approximately the proper contour. Only a slight amount of the tread is turned off, or none at all, and the throat and gage side of the flange are not even turned smooth after the welding, for it has been found that after the wheel has been in use for a while it is difficult to tell whether it has the original flange or a built-up flange. Mr. Wood stated that the cost per 26-in. wheel was approximately $4 for building up the flange in this manner.

The question was raised as to the desirability of reclaiming wool waste and lubricating oils, and while few of those present had had experience along this line, it was agreed that some method of reclaiming was an economy which should be put in. Mr. Wood said that he was installing a filtering system at a cost of $200 which would have a capacity for filtering old oil of 30 gal. a day. This separates the oil from the water as well as dirt and waste and he expected it would result in a very worth-while saving.

The next question taken up was whether it would be economy to bring a steel wheel back to its original diameter, after it had reached its last turning, by making use of a steel tire. Mr. Creelman, Pennsylvania-Ohio Electric Company, had had a great deal of experience with handling steel tires and wheels when he was with the Boston elevated system. He told of some of the difficulties in keeping the tires from coming loose. In this endeavor, the allowable shrinkage had been gradually increased from 0.0030 in. to 0.0075 in. He pointed out that it was necessary to bore each tire specially for the particular center on which it was to be shrunk, since the diameter of the center had been found to compress from 0.005 to 0.010 in. after each new tire had been put on; in other words, a new diameter of the center had to be figured on upon each re-tiring. It was his opinion that the steel tire costs almost as much or more than steel wheels by the time it is turned and installed; that there is little if any saving in labor; that the steel-tired wheel is unsafe and unsatisfactory and introduces a good chance for an accident, and that taking into account the full consideration of labor and material cost the solid steel wheel is much more economical. Others corroborated this opinion, though two or three were having reasonable success with the use of steel tires. In this connection, Mr. Witt, West Penn Railways, brought out that his company is getting an average life for rolled steel wheels of more than 400,000 miles, many running more than 450,000 miles. These are wheels used in interurban service, where all magnetic brakes are employed and the 34-in. wheels are permitted to wear down to as low as 29¼ in. before being removed. The wheels are turned only when it is necessary to correct the flanges, which is usually necessary on account of the many curves over which the cars run. This long life is attributed to the absence of brake shoes and to the fact that the wheels are allowed to wear down to so small a diameter. Most companies cannot use wheels beyond a diameter of 31½ in. on account of motor clearance, but sufficient clearance is obtained on Mr. Witt's cars by tilting the motors up 1 in. when they are installed on the trucks.

The next topic brought up for discussion was as to the best method of installing tape bands on mica V-rings on old type armatures and as to what insulation is used. Inquiry developed that most of the men were making use of Hope tape and string bands and shellac. Mr. Bull, Pittsburgh Railways, supplied the interesting information that his company is not using any bands, but instead is simply applying a cement composition made up of dextrine, plaster of paris and shellac, with very good success. He said that he had had much less trouble in using this cement than he had with tape and string. He could not supply the proportions of the composition at the meeting, but stated that he would be glad to give this information to any one interested.

From the discussion as to what kind of circuit breaker had given the best result for double-truck cars, it developed that there are a great many types of circuit breakers in use, but that they have been the source of but little trouble. It was also brought out that the breakers are but rarely calibrated. Those companies which have attempted to check them up have taken them off the cars and calibrated by means of a water rheostat, but have found that only a few were out of calibration, and these not greatly. Some trouble was noted with trainmen setting the circuit breakers up to the top notch on the type which has a screw for adjusting the amperage at which the breaker operates. One company had had considerable trouble on account of the circuit breakers being mounted underneath the cars, where they collected a good deal of dust and hence frequently short-circuited.

The Miller trolley shoe came up for discussion and was generally thought to be very satisfactory except for one limitation, that it will not back up. Because of this limitation, one master mechanic had found it desirable to mount the type E Miller shoe in a bayonet harp so that on a big traffic day trolley wheels could be conveniently substituted for the shoes in order to aid in the switching of cars required on such occasions. Mr. Witt said that it had been the experience on his property that the Miller shoe would back up where the wire was low, but that it was impossible where the trolley was high. The average life of a Miller shoe was reported to be from 7,000 to 8,000 miles by several of those present. One company not represented at the meeting was reported to be securing a much better life by removing the shoes when they became grooved and grinding them to the original contour by means of a special emery wheel and jig, which brought the shoe to the proper shape without adjustment. There was a general agreement that the shoe provides a good current collector; that it eliminates noise and arcing, and that best results are obtained when all shoes are used rather than a mixture of shoes and wheels, since by this practice the wire becomes slick and the wear therefore less.

Open circuits resulting from broken leads to the

armature coils, in the neck of the commutator, have formed a prolific source of trouble for the maintenance men. Many schemes have been thought out to eliminate this trouble, but it appears to be an erratic one and difficult of solution. While it was difficult to pin the cause of the trouble down to any definite thing, in general it was thought to be caused by the magnetic and gear vibration. One company tried to overcome this difficulty by putting on a steel band over the ends of the coils just under the top leads, but it was found that the coils would shrink after they had been in use for a while and would become loose and vibrate and break.

Mr. Meyer, Beaver Valley Traction Company, said that he had adopted the practice of weaving heavy gray webbing in among the leads in order to make a solid mass, and as a result had had only one broken lead in a little over a year. Mr. McClosky told of the practice of the Westinghouse company in connection with the type 506 motors. After the leads have been soldered to the commutator they are first given a coat of very light shellac, followed by a coat of very heavy shellac and then bound with a band of heavy machine twine and again shellacked and baked. He said that while this process had given very satisfactory results for this type of motor the manufacturer was not yet ready to recommend it for all armatures. He pointed out that some companies have reported that this trouble has been practically eliminated by not soldering the leads to the commutator, on the theory that the vibration is then not concentrated at the neck of the lead, at the point where it is attached to the commutator. Mr. McClosky also spoke of the method which was used by the manufacturer in connection with the type 333 motors, a large number of which have been in service for three years without any broken leads. In this motor phosphor bronze clips were riveted to the leads to reinforce them. A high-necked commutator was also used, but the absence of breakage of leads is believed to be due to the better application of remedial devices than to the high-necked construction of the commutator, and in fact he said that not much advantage is apparent for the high neck.

Some one brought up the thought that the sharpness of bends in the leads had a bearing on the amount of breakage, but Mr. McClosky pointed out that he had had an excellent opportunity to experiment with more than 100 motors of a great variety of types, some with sharp bends and others with long leads and gradual bends, and he had found that more breakages had occurred where the leads were long and the bends gradual, probably due to the greater opportunity for vibration. Yet he said that he knew of an epidemic of breakages in some of the motors used in the subway in New York which was cured by putting on long leads. Mr. Bull, Pittsburgh Railways, said that his company had had good success with some of the large interurban motors in eliminating this trouble by plastering the neck full of a composition made up of about one-half dextrine and one-half plaster of paris, but said that this remedy could not be used on small motors. Another delegate pointed out that he had tried this remedy, but found that this made repair work on the armature exceedingly difficult if the composition had to be taken out.

The next question discussed was as to what results had been obtained from leaving front and rear hoods open to ventilate the windings of railway motor armatures. The tendency among the manufacturers, it was stated, is to do away with the hoods, especially for interpole motors. Summing up the thoughts expressed by the railway men, it would seem that while they feel that the hood helps to prevent flashovers, yet the advantage of overcoming the accumulation of dirt behind the hood is of considerable value. The tendency seems to be toward leaving the hoods off. For example, the Cleveland, Southwestern & Columbus Railway is leaving the hoods off altogether on all of its old Westinghouse 56 motors and finds their operation more satisfactory.

The next question raised was whether it was advisable to prevent excess oil in the armature bearings from saturating the field windings by providing an overflow outlet in the housing. In the discussion it was pointed out that the later type motors and all modern compressor motors are provided with such an overflow. Some thought it as undesirable to have the excess oil dripping into the pits as to have it in the motor housing, but others thought that the dripping of oil into the pits would be a good telltale on poor workmanship on the part of the oiler. Mr. Rogan, Pittsburgh Railways, said that they had had so much trouble from excess oil that they had bored two 1⅜-in. holes in the bottom of the motor housings so that the excess oil could run off. This practice had to be changed later to prevent snow and ice from getting into the housing as the motor sheared along the snow and ice between the rails. Mr. Creelman has provided an outlet down through the housing of such construction so that the oil is drained out but water cannot get in, unless the motor actually stands in water.

Mr. McClosky spoke of the fact that some trouble along this line resulted with ventilated motors when operating at high speed. The cooling air is pulled in under such high velocity and pressure that it pulls oil from the bearings into the motors. He said it was planned on future motor designs to limit the amount of air that can get into the housing. He recommends that the air passages be kept perfectly clean so that there would be ample intake area and thus decrease the draught on leakage ports such as through the bearings.

The question was raised as to whether companies check the spring tension on brushholders frequently and as to what tension is used on different sizes of motors. The discussion developed the fact that few companies give any particular attention to the compression of brushholder springs. Most of the companies inspect the springs only incidentally and on rare occasions test the spring pressure with a pair of scales. A spring pressure of 4½ lb. per square inch is maintained in Pittsburgh, while 6 lb. is the amount carried on the West Penn Railways.

The discussion following the query as to what general types of pinion pullers are in use brought out the fact that the majority of the shops are making use of the old-fashioned sledgehammer and wedge method of removing pinions. The reason for this, it seems, was that many of the pinion pullers on the market are of such design that they cannot be used where the clearance between the pinion and motor housing is small. It was found that two of the companies follow the practice of heating the pinion when it is put on, having had fewer loose pinions as a result.

The discussion then turned to helical gears. It was soon apparent that the great reduction of noise and vibration and the apparent long life of the helical gears are giving them a real hold on the master mechanic's attention. Mr. Witt reported that the gear and pinion

manufactured by the R. D. Nuttall Company, which has been in use on this property for the last two and one-half years and was exhibited at the Atlantic City convention last year, has now run 386,000 miles to date with scarcely any noticeable wear. This property now has about eighty gears and pinions of the helical type in service and Mr. Witt stated that he is having considerably less armature trouble, presumably due to the lessened vibration. Other delegates testified that the use of helical gears and pinions with safety cars and large double-truck cars, with 24, 26 and 34-in. wheels, have uniformly given very excellent results and to date, after two years or more of service in some cases, have shown no appreciable wear.

Incidentally the session turned to bearings, and Mr. Witt offered the interesting information that he had done away with the castiron shell altogether and was using bearings made entirely of babbitt metal, having a composition of 80 per cent lead and 20 per cent No. 1 More-Jones babbitt metal. He said this had overcome the end play trouble and all undue wear on armature and axle bearings. When those bearings are worn out it is possible to scrap the whole thing rather than to melt out the babbitt and reclaim the castiron shell. He said that when this practice was first begun a fifty-fifty composition was used and some breakages followed, but no broken bearings have occurred since beginning the use of the eighty-twenty composition. In installing a pair of these babbitt bearings leather liners are placed between the two halves and the inspectors are instructed to watch carefully to see that the bearings are always tight. He said that this was essential to their successful use.

Mr. Bull remarked, in answer to questions, that motor failures on the road have been very materially reduced by the practice adopted in the shop of subjecting all motors to a test of 125 per cent of full load for a period of fifteen minutes in each direction before the motor is placed in service. This has been found to show up any broken down fields, armature shorts, etc., before the motor gets into service.

Rail Joint Reclamation

In New Orleans Old Angle Bars Are Built Up and Ground and a Novel Insert Is Used to Replace Broken Rail Ends

AT A cost of 80 cents for material and labor, as compared with $2.50 to $3.50 for a new angle bar, M. V. Houlard, superintendent of track New Orleans (La.) Railway & Light Company, is reclaiming about 6,000 joint plates a year. These are taken out of track that is to be rehabilitated or laid new and after reclaiming them they are used for rehabilitating the joints on other track.

As the old angle bars are taken out of the track they are accumulated at the track storage yard. There they are sorted and stored in neat piles and as rapidly as a small crew of men can handle them they are reclaimed and restored ready for future use. If they are bent they are heated and straightened in a press. They are often worn as much as ¼ in. at the top, and sometimes the bottom is somewhat worn. Slightly more than enough new metal is then deposited along the edges to make up for any amount that has been worn away.

The final step is to grind off the top and bottom edges so that the plate will fit the rail properly. This is done by bolting the plate temporarily in a jig on a piece of track so that a Goldschmidt grinder may be used for the work. It is claimed that a better fit can be secured on old rails with these reclaimed plates than with new plates, since they can be made to take into account the fact that the railhead as well as the old plate has prob-



"DUTCHMAN" SPLICE BAR USED FOR REPAIRING BROKEN RAIL IN NEW ORLEANS

ably worn to a certain extent, whereas a new angle bar would be made correct for a new rail.

A Novel Scheme for Repairing Broken Rail

A rather unique method of repairing a break in girder groove rail has been used in New Orleans. Either an oxyacetylene flame or a saw is used to cut off a short section of the head of the rail at each side of the break. A piece of old center-bearing rail of 9-in. section is then prepared as a "dutchman" splice bar by burning off the base and all of the head except a short piece of about the right length to fill in the gap which has been made between the two broken railheads. Bolt holes are also burned in the web of this piece and it is bolted in place through the web of the running rail and welded at the edges and at the joints in the railhead. Enough metal is deposited along the flangeway, if needed, to make this continuous, and a grinder completes the job by smoothing up both the tread and the flange surfaces of the rail.

If the rail becomes badly cupped at any point or broken down at a joint, thus necessitating the cutting out of a short piece of the rail, such an opening can



GRINDING OFF THE EDGES OF RECLAIMED ANGLE BARS

also be filled in and repaired in the above manner. Very good success has been had with rails repaired in this way. The accompanying illustration of this method shows only the manner of preparing the dutchman and does not show the manner of preparing the rails to be spliced by cutting back the heads.

C. E. R. A. Midsummer Meeting Ashore

Ottawa Beach Resort Scene of Interesting Meeting, at Which Several Practical Papers Occupy Attention—Members Miss Usual Boat Trip, but Enjoy Shore Sports

WITH Robert I. Todd, president, presiding, the summer outing convention of the Central Electric Railway Association began its two-day meeting on July 8 at Ottawa Beach, with about 150 in atetndance. Despite the attractions of golf, bathing, tennis and fishing, the sessions were well attended, while the evenings were made enjoyable with dancing and that other favorite indoor sport—favorite since the drought settled upon us. While the attendance was far below normal, those present seemed to enjoy themselves and the general feeling was that it was a good convention, though there were many references to the boat trip of former conventions, and if the meetings were short and the papers not as outstanding as they are at times, the interchange of ideas between operators was well worth the time spent off the job.

At the morning session on July 8 the first order of business, after the reading of the minutes of the Louisville meeting in March by Secretary A. L. Neereamer, was the report of the committee on the formation of an American electric express company by the chairman, H. A. Nicholl, Anderson, Ind. In presenting his report he expressed great regret at the lack of interest on the part of the committee members and member companies in connection with the compilation of data for the report. In view of this attitude on the part of the companies, the substance of the committee report was contained in a resolution stating that the committee did not recommend the establishment of such an express company at this time, but urged the installation of through express rates between companies and an endeavor to secure through business. This resolution was adopted, after amendment proposed by C. L. Henry, Indianapolis, Ind., that some provision be made for prompt settlement of disputes arising over the division of through rates. The finding which the committee found necessary to report was a distinct disappointment to some of the railway men.

Mr. Nicholl then was called upon to report for the committee on the president's address at the Louisville annual meeting. This was the address of former president John F. Collins, Jackson, Mich. The committee's report advised that certain of the president's recommendations be referred to proper committees for further study and disposition and that other recommendations be indorsed, while issue was taken with one or two other recommendations. The committee report was accepted. (Mr. Collins' address appears in substance in the ELECTRIC RAILWAY JOURNAL for March 13, 1920, page 527).

Reporting as chairman of the standards committee, H. H. Buckman, New Albany, Ind., also lamented his inability to get co-operation from members of the committee and repeated some of the excuses given, saying that for this reason he had no definite report to make. This aroused a lively discussion, in which the issue was whether or not the standards committee, which has always been a most important one and has done some very constructive work in the C. E. R. A. territory in times past, had ceased to be of importance. The discussion resulted in the loud approval of a motion proposed by C. L. Henry that President Todd be instructed to address a personal letter to all the members of the standards committee and to the managers of the roads represented by these men urging the great importance of that committee work and that it be given full attention. In this connection W. H. Bloss referred to the very complete compilation made during the war of data covering rolling stock in use in the territory as being of great value in the study of further standardization.



The ladies return from a launch ride to some of the 1,000 ports of Black Lake. John Benham was the host, you might know. Without him on the entertainment committee, there is a noticeable void.



The start of a 100-yd. (lame muscles) race. We don't know who won. There wasn't any finish to the race. But notice the variety of "form." Electric railway men aren't in the habit of running.

Mention was also made, in answer to a query of "why standardization?" that of the steel wheels made, 90 per cent are used by steam roads and they are all to one specification and 10 per cent are used by electric roads and there are 360 kinds and sizes. Mr. Richardson of the Midvale Steel & Ordnance Company, whose paper came later in the session, said that the standardization of wheels would help roads as well as manufacturers because deliveries would be better and prices lower.

James Harmon, New Albany, Ind., chairman of the C. E. R. A. committee on safety work, recommended that the subject of safety be put on the convention program from time to time, saying that he believed it had not been so considered since 1907. His report was adopted.

A telegram from A. Gaboury, president Canadian

Electric Railway Association, was read. This called attention to Montreal as an ideal location for the next convention of the C. E. R. A.

The remainder of this first session of the convention was occupied by a very instructive and interesting motion picture and talk by G. A. Richardson on the mining of ore, production of iron and steel and manufacture of rolled steel wheels as carried on by the Midvale Steel & Ordnance Company. A motion picture of the members on the boat trip last year was also shown, much to the delight of those who had posed.

The second session was held Thursday afternoon and was devoted to an "experience meeting." C. L. Henry, chairman of the program committee, said that this sort of meeting was somewhat of an innovation and was an attempt to get some of the men who were really doing certain concrete pieces of work to come in and tell about them. He said a general request had been mailed to member companies to have some one in the organization relate some accomplishment of the past year. As a result, five prepared "experiences" were reported, one of these being given at the Friday morning session.

One of these reports was by Frank R. Coates, president Toledo Railways & Light Company, who detailed the "Moving the Cars to Michigan," which was done so dramatically and which has already been chronicled in these pages. Abstracts of the other experience discussions are grouped elsewhere in this issue.

G. K. Jeffries, general superintendent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, told of some work his company had done in order to make it possible to use Master Car Builder equipment satisfactorily on short curves in special work in city service. Considerable trouble had been experienced through derailment caused by the shorter gage distance between inside of flanges on equipment of this sort. It was decided to try to turn off ⅛ in. of the wheel flange on the inside and this was accomplished, even though the wheels were made of chilled steel. In answer to questions, Mr. Jeffries said that this work was done on a regular lathe, that there was no apparent damage to the lathe or trouble experienced and that there was no apparent damage to the wheel, which seemed to wear as well as ever, although he did state that the finishing touches were done by an emery wheel.

Another member stated that his company had met the same difficulty and had merely set the wheels ¼ in. farther apart on the axle and had experienced no difficulty on account of this difference in spacing, but on the other hand had been able to negotiate the special work short curves satisfactorily.

In the discussion on the "experience" papers, Mr. Brown, in answering a question, stated that sidings which were put in by his company in order better to distribute freight and express, where these sidings were installed for a particular company, they were paid for originally by the companies benefited, but were finally paid for by the railway company by deducting from bills of the company in question at the rate of 5 per cent per month.

Mr. Gunn's paper on "Welding Flanges" attracted a good deal of discussion. He stated that the flanges were, of course, turned after being formed by welding, but that he had not included the cost of this turning as an additional cost of treating the wheel, because he assumed that any wheel brought in for working over on account of sharp flange would have to be turned, and it would be no more expensive to turn one on which the flange had been built up than one on which the flange had not been built up. No difficulty was experienced in cutting the built-up flange. He stated that after much trial of almost every sort of steel he had determined that grade D steel rod gives the best service as material to build up the new flanges.

One interesting point was that the welder, that is, the operator, never had any previous experience on railways and had never had any experience with a welding outfit of this sort, although he had done a small amount of oxyacetylene welding. For this reason Mr. Gunn said he thought it was not necessary to obtain a high-priced man to start with. The welding outfit used was one bought originally for trackwork and adapted to this work, and while a larger machine would really prove advantageous, excellent work was being done with the one in use. From a sample Mr. Gunn brought with him it was impossible to tell where the weld began and where the original metal ended. Mr. Gunn said that he had used this same welder successfully for repairing drawbar heads, building axles up to standard and all general shop-welding work which he had found necessary on his road.

In a subsequent informal discussion Mr. Brown explained the lower cost per car-mile after abandonment of the power plant mentioned in his discussion by saying that the measurements of kilowatt-hours per car-mile were made at the substation and not on the car. Total car-miles were divided into total kilowatt-hours over a certain period of time. With the new arrangement, with a higher and more uniform voltage for distribution, with power measured only when actually being used by the cars, and, consequently, there being no operation of plant while no cars were running, the final result indicated a lower cost, or a lower kilowatt-hour per car-mile.

At the Friday morning session C. L. Henry of Indianapolis presided in the absence of President Todd, who had found it necessary to return home. Mr. Henry read a telegram from Robert M. Feustel, who was scheduled to present a paper on the "Interurban Electric Railways, Their Problems and the Solution Thereof." Mr. Feustel regretted his inability to be present and present the paper on this subject and stated that it had been impossible for him to obtain and digest sufficient data to make a presentation of the subject advisable, because if he presented it at the present time it would represent merely his personal opinion and he could present no conclusions drawn from data which he anticipated having and upon which he hoped to base a paper in the near future.

The other paper of the morning, on the subject of "City Electric Railways, Their Problems and the Solution Thereof," by A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company, Akron, Ohio, was read by Mr. Henry in the absence of Mr. Blinn, H. A. Nicholl being in the chair.

Mr. Blinn in his paper passed over all other problems of the railways except the financial one, which he says stands out with such prominence that all other problems are of a secondary nature, for the business has been literally starved to death and can only be made well and strong again by increasing its nourishment in the form of more revenue. He also made the assertion that the conclusion must unquestionably be reached that, generally speaking, the fares are not only now wholly inadequate for the needs of the business but the income has never been wholly sufficient to pay expenses and a

fair return on the fair value of the property. He argued that this was the result of the public's exercising its right to control without acting on its obligation to protect. He also blames the starvation policy of the municipalities for the fact that the physical properties are not now in the 85 per cent physical condition in which every street railway should find itself, but he does not lay all the blame on the municipalities, but partly on the managers of the properties, who have been at fault in not seeing to it that the conditions under which the railways have been operating for years be made public.

Mr. Blinn stated that the stockholders have been the worst losers, in that they have not only not received a return from their stock but their property has been worn out and the investment thus impaired.

He repeated the oft-heard statement that the present problem is to bring fares up to a point which will put the railways in a sound condition and emphasized the argument back of this, the troubles in the way of getting it, particularly political ones, and urged the taking of every opportunity of making public the story of the railways. He argued that until communities take more than a passing interest in the affairs of their public utilities full justice will never be done.

Referring to the pre-war condition, under which he said that the old rates were not sufficient to pay all of the cost of keeping properties in efficient operating condition, he urged that the railway industry should exert itself to maintain present increased rates of fare even though the country may some time enjoy pre-war price levels. This, he said, must be done for the benefit of both the public and the properties, to the end that the public may be served as it wants and the lines be maintained in satisfactory physical condition and at the same time capital be paid a justly deserved fair return.

There was no discussion of the paper.

Mr. Henry reported for the executive committee that an amendment to the constitution would be presented at the next regular meeting of the association, which amendment would provide for two regular meetings in place of three meetings per year.

With reference to the time and place of the next meeting, the executive committee announced that it would be held either at Purdue University, Lafayette, Ind., or at Indianapolis, and that the date probably would be Dec. 3.

The convention adjourned Friday noon.

Freight and Motor Truck Competition Report

A report from the committee on interurban freight and motor truck competition was presented to the executive committee and becomes a part of the record of the meeting. This report had no place on the program and so occasioned no discussion.

To the Officers and Members of the Central Electric Railway Association:

The following report of the committee on interurban freight and motor truck competition is respectfully submitted for your consideration.

Your committee sent a questionnaire to a great many interurban companies and for the sake of brevity your committee has combined in a general way the answers to the questionnaire with its own general views on the situation.

1. Have you any motor truck competition?

There is considerable motor truck competition and without having answers from all roads the committee assumes that at least 60 per cent of the interurban railways have such competition in the way of more or less permanent all year around service.

2. Approximate number and capacity and do they have trailers?

From answers received it would seem that within the three states covered there would be at least 700 motor trucks having a capacity of from 1 to 10 tons, with probably 250 trailers which average from 1 to 5 tons capacity.

3. What service do they perform?

As a whole the service is practically similar to that performed by the interurban railways.

4. Between what points is this competition strongest?

Truck competition is most dense, radiating from commercial centers having large manufacturing interests and wholesale houses. This is especially true at cities like Indianapolis, Toledo, Cleveland, Akron, Detroit, Columbus, Grand Rapids, Kalamazoo, etc. A great deal of course is dependent upon the condition of the roads, but just as soon as good roads are completed leading from business centers it is there that competition quickly springs up.

4a. Give comparison of truck service with service furnished by your company.



Harry Reid, executive committeeman and Robert I. Todd, president of the C. E. R. A. are here seen loafing on the board walk at Ottawa Beach, Mich., between sessions of the convention. Ralph Brown, at the left, of Curtain Supply fame, got a "stand in" with Reid by leading the bunch in a song about "Old Kentucky."

No satisfactory replies were received to this answer, although service is given at all times during the day, usually, however, mostly in the morning and in the evening.

4b. Give comparison of rates.

Generally speaking, the rates are higher than those charged by the interurban railways, although in some few cases the rates are a trifle lower, this, however, being due to the lack of proper knowledge on the part of the truck owners of their costs. Higher rates are natural, as the truck service carries with it the pickup and delivery of all freight handled.

4c. Do the truck operators give receipts, take receipts, collect tax?

Generally speaking, the operators do give receipts and take receipts; however, to the best of our knowledge war tax is not generally collected.

5. Are the truck operators in your territory responsible?

Generally speaking, the trucking concerns are responsible and honor claims when presented.

6. What commodities are being handled by trucks in your territory?

The answer to this question has already been made in answer to question 3.

7. Have you any suggestions to offer as to manner of meeting this competition?

The consensus of opinion in the answers all tend toward the one general broad answer, which is that good service on the part of interurban railways is the best method of competing with truck competition.

8. Are any truck lines operating as "feeders" to your lines?

There are but very few instances where truck lines operate as feeders to interurban railways, as it is quite a pioneer movement.

9. State general conditions of roads on which truck competition exists.

It is obvious that the condition of the roads over which truck competition is handled must necessarily be very good,

as very little competition is found where the roads are poor. The owners of trucks competing are wise enough not to pick up any business except the cream of it and naturally stick to the best roads.

10. What is cost of operation of trucks in your territory?

The cost of operating trucks naturally varies as to size of the trucks, but when the information was gathered it seems that the cost of trucking varied from 35 cents to 60 cents per mile. It is natural to assume that under the present existing conditions of high wages and of great cost of trucks this figure might easily reach 75 cents per mile. As a whole, however, the owners of trucks or associations performing such service do not themselves know, or if they do they will not divulge, the real fact as to the real cost of performing such service. They are going through the formative period at the present time and must naturally learn by experience that they are not properly charging all the cost of such service and that they are not making proper allowance for depreciation, wear and tear, interest, etc. As far as the length of time which one concern may continue in business is concerned, that is hard to learn. However, at large centers of population already established, concerns which started truck competition are still in business and it has been going on for two or three years, with the likelihood that they will keep on, as they are more able, in a business way, to "carry on" than the individual truck operator, who as a rule does not last much longer than nine to twelve months.

11. Average number of months operated each year.

About nine months in the year, although there are sections where they operate only about six months and others where they operate all the year around.

In considering this report the committee wishes to extend its views to the association at this time.

It is quite evident from replies received that little enough attention has been given by various managers to the seriousness of truck competition, as there seems to be quite a lack of interest in the attempt to preserve their own business. The committee wishes to emphasize the necessity of the individual roads quickly waking up to a situation now confronting them which it believes is becoming more serious every day.

With all the money which is to be spent in the states canvassed it would seem quite advisable for the individual roads or this association, if deemed wise, to bring to the attention of the authorities in charge of building highways the fact that it would be well to build a road which could be utilized to act as feeders for electric railways rather than to build long stretches of road between important centers which will act as competitors for the electric railways. There is no question in the mind of the committee but that such competition is here to stay and that we may as well face the music; there is, however, no reason why this association or its individual members cannot do some missionary work with the before-mentioned authorities, for they have a perfect right to do so, as their investment is very much in jeopardy.

Your committee respectfully suggests to the association members the advisability of becoming more closely associated with the local Chamber of Commerce, or of any association which today is lending its aid to transportation by means of trucks. With the proper diplomacy we believe a great deal of good can be accomplished.

It is likely that opposition will be met on the part of such associations in the way of stating that the transportation system of this country as a whole has been near the breaking point several times in the past few years and that it is only natural as a matter of self-protection for individual shippers or associations of shippers to fall back on any means of transportation.

Such statements can only be met by a clean-cut counter-statement as to the financial condition of the interurban railways.

The committee of course realizes the financial stringency at present, but believes that better use can be made, with slight expenditure, of the terminals now used by interurban railways and that better results can be obtained if a closer co-operation is had with the shipper.

Since automobile industries have seen fit to spend thousands of dollars in advertising, it would seem advisable to this committee that the association carefully consider the necessity for spending some of its energies and real money in promoting an advertising campaign setting forth the service performed by electric railways.

The committee further brings out the point that it would seem advisable for the individual members or the association as a whole to bring to the notice of the public service commissions the seriousness of truck competition, suggesting the advisability on the part of the commissions of investigating the matter with the idea in view that owners of trucks should be classed as common carriers. The committee further believes that more attention should be given on the part of interurban railways to the matter of soliciting long-haul traffic rather than to worry themselves about the short-haul traffic, as the committee believes it will be impossible, for some years to come at least, to bring about the abandonment of truck competition in short-haul service. This of course means providing through rates as between various connecting interurban railways.

Your committee submits the foregoing report, with the hope that certain recommendations may come from it, with this statement, that the committee has not seen fit to offer any conclusive or definite recommendations as to the method of procedure in the future. It would seem that this committee should be discharged and that perhaps another committee should be formed to take its place, the duties of which might be for the promoting of the interests of the interurban railways, inasmuch as the duties expected of this committee seem to the general chairman to have been performed.

Knoxville Passes New Traffic Ordinance

THE passage of a new traffic ordinance by Knoxville, Tenn., furnishes one more example of stringent ordinances to increase safety and expedite traffic. In the near future it is hoped that more uniformity in urban traffic regulations will prevail, as it is very difficult for the touring motorist or interurban street car to conform to non-standardized traffic regulations.

The new Knoxville ordinance provides for the registration of all automobiles with the city police department and the licensing of all motor vehicle operators. It provides that no vehicle shall pass a stationary street car while it is receiving or discharging passengers. No street car is allowed to stand in excess of three minutes in the business district with certain exceptions. The ordinance provides for the "near" side stop of street cars and prohibits "jay" walking by pedestrians. One notable feature is that forty minutes is set as the standardized parking time for all restricted locations.

The motor speed limit is fixed at 15 miles in the business district, while the street cars cannot operate at a speed in excess of 8 miles. The penalties vary from $3 to $50 and revocation of license.

The Boy Scouts are aiding in the enforcement of the "jay" walking law, as it is the intention stringently to enforce this feature of the ordinance.

Symposium of "Experience" Papers

Power Plant Economies, Maintenance of Equipment and Interurban Freight Service Subjects of Special Attention in the "Experience Meeting" Session of the C. E. R. A.

AS INDICATED in the report of the Ottawa Beach meeting of the Central Electric Railway Association, July 8 and 9, one session was devoted to a recital of noteworthy accomplishments of the past year. The prepared reports of these are abstracted herewith:

Power Plant Economies

BY SAMUEL WAGGONER
Superintendent of Power Plant Indianapolis & Cincinnati Traction Company, Rushville, Ind.

WITH a view of reducing our coal consumption and other operating expenses, we instituted early last year a very comprehensive and exhaustive study of our power plant operating conditions. After duly digesting the information that we obtained from this study, it was decided that we would make a few of the many needed improvements to bring the operation of the plant to a more efficient and economical running condition. Up to that time we had been experiencing considerable difficulty with maintaining a uniform temperature of our boiler feed water; the best we could do with the equipment as it stood was to maintain a temperature of 180 deg. F. This condition was not brought about from the fact that the heater was too small, but was attributable to the unavoidable leaks in the condenser tubes, etc. In order that we might relieve this condition, it was decided that we install a hotwell tank on the outside of the power station proper, into which all condensation and other returns are piped. The tank is equipped with a closed coil, through which is passed a portion of the exhaust steam from the pump and other auxiliaries, bringing the feed water temperature up to 125 deg. at the tank before it is delivered to the feed water heater proper. This arrangement has brought the feed water temperature up to 210 deg. and effected a saving in the over-all operation at the plant of at least 4 per cent.

Other economies that were effected by this arrangement were the ability to recover the condensate from all over the station into this one central reservoir for boiler feed purposes, thereby eliminating the necessity of having to use such a large percentage of fresh water. This in turn holds down the amount of incrustable matter in the boilers, thereby enabling us to run our boilers for longer periods between cleanings.

It has been our policy for the past three years to give closer attention than ever before to the physical condition of all power station apparatus and appurtenances thereto, and especially to all auxiliaries that are using steam. It is my opinion that there is no source of so great a waste and that there is nothing that tells so heavily on the coal consumption as leaky pump valves, and that more attention than heretofore should be given to each piece of auxiliary equipment in our station operation.

Another thing we have done that has proved a source of great gratification to us is the thorough inspection and overhauling of all valves and cutouts in connection with the boiler equipment every time a boiler is out of service for cleaning. We thus do away with all hissing of steam and dripping of condensate, which makes conditions in the boiler room intolerable for the man who has to make his living by working there.

In addition to the above improvements, we have installed S. C. water regulator, damper control, etc., and with a careful check-up of each day's operation we have been able to show a decrease in the cost of the fuel for 1919 of $7,578.55 and for the first four months of 1920 of $2,077.18. On an investment of not to exceed $10,000 this would mean an interest return of at least 76 per cent.

Our average daily load amounts to 24,000 kw., average daily coal consumption 96,000 lb., average daily power factor 70 per cent, water used daily, from and at 212, 120,000 United States gallons, giving us an evaporation of better than 8: 1, which we consider very good, under our operating conditions.

We have also been able to show a very gratifying economy in our power station lubrication. In the past we experienced considerable difficulty on this question, but in spite of the ever increasing cost of oils for power station lubrication in the past three years we have been able to show a steady decline in our monthly and annual cost. In the year 1919 we showed a reduction of $341.96, and for the first four months of this year we show a reduction of $269.48 over the same period of last year. This has all been brought about by making a few very necessary observations from day to day and keeping a close record of operating conditions from hour to hour.

Experiences on the Interstate Public Service Company's Lines

BY L. M. BROWN
Superintendent, Columbus, Ind.

Freight Service

FOR a number of years the freight business on the lines operating between Indianapolis, Ind., and Louisville, Ky., was regarded as one of the necessary evils and was discouraged in every possible way. Up to and including the year 1917 the total revenue from freight transportation was less than 8 per cent of the gross earnings, but there has been a steady growth since that time, until now more than 16 per cent of the gross revenue is from this service. It is felt that this steady growth can be further increased if the proper facilities are provided and adequate service maintained.

At the present time six local freight trains are operated daily on this system and through freight is handled in trail cars on these local trains. It is the plan further to improve this service as soon as the voltage for the entire system can be made uniform and some of the equipment rebuilt and equipped to handle a larger number of trail cars. The plan is to operate only a

local freight service during the daytime and to put on a through freight train at night from each terminal in each direction, so that shipments received one day will be ready for delivery the following morning at every station on the line. The operation of a through train will give the shipper quicker delivery and will facilitate the movements of trail cars and increase the business.

The present freight equipment consists of six motor cars and thirteen box trail cars. Each of the motor cars will handle one or two trailers and one is of steel construction with four 125 hp. motors and capable of handling as many as ten trail cars. An electric locomotive has been purchased and will be placed in service this month which can handle from ten to twenty trail cars. Most of the trail car equipment has been secured within the last two years, five of the cars being secured in November, 1919, at a cost of $2,500 each. Within the last year fourteen flat cars, formerly used as service equipment, were placed in the freight service, and the revenue from this equipment amounts to more than $5,000 per month.

Believing that the best methods of increasing the revenue to meet the high cost of operation is in the long haul passenger travel and in the freight business eight modern steel passenger cars are now being built and should be ready to be placed in service within the next few weeks. When this is done the cars now being used in limited passenger service will be rebuilt into passenger trail cars and the motors placed under some of the present freight motor cars, and these geared down so as to be able to pull five or six trail cars at a time.

The business now seems to be limited to the amount of equipment available. With the limited amount of equipment and inadequate terminal facilities the gross freight revenue for five months of 1920 has amounted to $94,731, or more than the total gross for the year 1917, and an increase of 50 per cent over the same period for 1919. While we know that a large percentage of this increase is due to the inability to secure equipment from the steam lines, yet we believe that the point has been reached where the freight earnings can be made a very profitable part of the business.

Previous to this year most of the freight handled has been less carload shipments, but during the months of January and February, 1920, 88 carload shipments were handled, 125 in March, 147 in April and 192 in May. These carload shipments have practically all been local to our own line and had we been able to furnish cars for shipments to connecting lines this number could have been increased several times. The principal commodities handled on these cars consisted of cement, logs, canned goods, syrup and glucose. A number of industrial switches have been built into several large manufacturing plants and others are in progress, which will tend to increase this volume of business very much.

A number of improvements at stations have been made. A new freight station was built in Louisville last year at a cost of $30,000 and a combined freight and passenger station was built at one of the smaller towns at a cost of $10,000. The present facilities are to be increased, sidings lengthened for the handling of trains and other improvements are to be made as the expenditures can be met.

It has been the plan of the company to have a number of new box cars built, but owing to their increased cost, the inability to obtain labor and materials and the recent financial difficulties this plan has been temporarily deferred. Efforts are now being made to secure box car equipment and several additional cars will no doubt be added in the near future.

This company has a well organized traffic and freight claim department which co-operates with the operating department in every possible way. Immediate attention is given to OS&D reports and many claims are eliminated in this manner. The best men available are used as freight trainmen, agents, checkers, truckers and helpers. Frequent meetings are held with these men and a recent campaign has reduced the claims for lost and damaged freight so that the claims account is less than 2 per cent of the gross freight revenue.

Tariffs are on file naming through rates to points on connecting lines and the tonnage from this is very heavy and could be considerably increased if carload shipments were accepted. The rates charged are practically the same as those on steam lines. No steam road connections are maintained and no interchange of steam road equipment has ever been made.

No attempt has been made in this article to furnish the actual net revenue from freight transportation, as no separate records are kept of the expenditures chargeable to the freight department, and these figures could not be secured in the limited time in which this paper had to be prepared.

It seems that one of the best ways to reduce the expenses to the freight business is in the handling of carload shipments, thus eliminating labor costs and congestion at stations. To do this it is necessary that industries be served by private sidings. If it were possible to work out some kind of an arrangement whereby sidings could be constructed from city street car tracks into industrial plants in the larger cities it would put the electric lines in position to compete better with steam lines and give superior service in the territory served.

Power Plant Abandoned

In November, 1919, for the 62 miles of the line operating between Indianapolis and Seymour, Ind., the use of the company's power plant at Edinburgh was abandoned and arrangements were completed for the purchase of power from the Merchants' Heat & Light Company of Indianapolis. The abandoned power plant was very inefficient and in addition to furnishing power for the line supplied a large manufacturing establishment. The plant was equipped with steam driven engines that had been in service several years and the current generated was carried on the transmission line at 15,000 volts, 25-cycles, alternating current and on the trolley at 600 volts, direct current. Under this change the transmission line for the entire system is being standardized, carrying 33,000 volts, 60 cycles, a.c. on the high tension line and 600 volts, d.c., on the trolley.

This transmission system has been extended to a number of public utility plants which are owned by the Interstate company and power is being distributed to the various communities in this territory. It has also been connected with the steam and hydro-electric plant of another subsidiary, the Southern Indiana Power Company, and is almost completed into Louisville, Ky. This system will, by interconnection with other operating companies, ultimately be a part of a great transmission system extending from the large hydro-electric power plant on the Mississippi River at Keokuk, Iowa, across Illinois into Indiana and ultimately connecting with Indianapolis and Louisville.

The necessary work in changing the transmission line so as to carry 33,000 volts instead of 15,000 volts and the purchase and installation of six new 60-cycle substations was made at a cost of $135,000. The following actual figures for the first four months of 1920 compared to the same period for 1919 show the saving in the cost of power which has been accomplished by this change:

	First Four Months	
	1919	1920
Net power costs	$36,371.14	$20,791.65
Kw.-hr. to feeders	1,550,900	1,318,238
Power costs per kw.-hr.	2.345	1.577
Kw.-hr. per car-mile	4.3	3.5
Car-miles operated	360,952	376,700
Power costs per car-mile	10.75	5.52

These figures for 1920 show a reduction from 1919 figures of 0.768 cent per kilowatt-hour. Applying this reduction to the kilowatt-hour consumption for 1920 (1,318,238 kw.-hr.) gives a saving of $10,124, or an annual saving of $30,372. Allowing 4 per cent for depreciation ($5,400) and 7 per cent for return on the investment ($9,450) leaves a net annual saving of $15,522.

Under this plan three power dispatchers working in eight-hour shifts are located near the middle of the line and they receive hourly meter readings from all generating stations and issue such orders as are necessary to keep the voltage uniform and the system economically operated. The connections with the local power stations along the line enable their use in peak-hour periods or when necessary, or, in the event of a failure at one point, the other plants can carry the load until repairs can be made. When the demand for current is light all the small plants can be closed down and current furnished from the station where it can be produced at the least cost. With this system the voltage is more uniform at all times than formerly and trains are kept on much better time. This is particularly noticeable when traffic is heavy and additional service is provided.

The work of changing the 41 miles of line of the Indianapolis & Louisville Traction Railway between Seymour and Sellersburg, Indiana, from a 1,200-volt, d.c. line to a 600-volt, d.c., with 33,000-volt, 60-cycle, a.c. on the transmission line, is practically completed. This makes the voltage of the entire line from Indianapolis to Louisville uniform and will enable the use of all equipment on any part of the system.

The Welding of Flanges on Steel Wheels

By E. B. Gunn
Master Mechanic Western Ohio Railway, Wapakoneta, Ohio

DURING the period of the war, when it was almost impossible to get steel wheels, it became a very serious question of how to get along and extend the life of the wheels in service.

I had had some experience in welding flanges on city car wheels and it had worked out satisfactorily on this class of work, and as our company had purchased an arc electric welding machine for use in track bonding, I started in July, 1918, to weld the flanges on our wheels in interurban service. Since July, 1918, we have carried this process through and up to June 1, 1920, have welded 114 wheels. We have had unusually good success, having had only three wheels to "shell" and these very slightly.

The method that we use is very simple and is carried through our shop by our usual shop workmen. We put the wheels through the turning lathe and take the smallest possible cut from the tread of the smallest wheel. After making this cut we shape the flange as though we had stock enough for a full flange and leave a groove on the side of the flange toward the tread, varying in size according to the condition that the wheel was in when removed from the car. Ofttimes, of course, the opposite wheel of the pair will be in condition so that the flange will not have to be welded. The wheel is now ready for the welding operator, who carries the first weld in the bottom of the groove and welds this some deeper than the balance of the welds, and carries this at least 10 in. ahead of the balance of the welds. This allows the operator to inspect his work better, and I believe gets a better amalgamation by allowing the first weld to cool before putting the balance of the welds in the groove.

The greatest care must be taken to have a steady voltage, as a slight variation will cause a poor weld. Or if the operator is not careful in keeping his arc to the proper slant and length it will cause trouble. For this reason a welding machine that uses the grid for resistance and uses the direct-current arc is not so successful for wheel work as the machine that uses the alternating-current arc, as it is almost impossible properly to regulate the intensity of the current with the d.c. arc, and this will cause a burning of the steel, where, by using a stabilizer, the arc can be regulated and the depth of the weld controlled. Our operator is very careful to see that this work is not being carried on when cars are being moved in the shop or around the yard, as a variation of voltage as small as twenty volts will cause trouble.

The expense of welding flanges is so low for the results obtained that it is hardly worth mentioning. The machine we use requires 9 amp. on 650 volts, direct current, the average time to weld a wheel is four hours and it will require an average of about 25 lb. of welding metal per wheel. The following would be the average cost of welding the flange per wheel:

24 kw. at 3 cents per kw.	$0.72	
Four hours labor at 70 cents per hour	2.80	
25 lb. grade D welding steel	3.00	
	$6.52	
Plus 25 per cent for overhead	1.63	
Total		$8.15

On a basis of increasing the mileage 125,000 miles per wheel the cost would be 6½ cents per thousand miles. We are increasing the mileage of our wheels by the introduction of the welding process by more than 125,000 miles, as the cut that is taken off from the tread of the wheel will average $\frac{5}{16}$ of an inch, while if a new flange would be required under the old method a cut would have to be made of from $\frac{5}{8}$ to $\frac{3}{4}$ of an inch, depending, of course, on the condition of the flange.

After all is said in regard to the success of flange welding, the greatest factor in it is a good careful operator, one who takes an interest in his work and tries to make a good record by being careful and conscientious.

In addition to the welding work that we have, such as armature shafts, axle building and other repairing, our welder takes care of the babbitting of the bearings and goes out on the bonding work when required, so that we do not have to charge his time up to the wheel welding except when he is directly employed in this work.

Experiences in Power Plant Operation

By Frederick L. Ray
Union Traction Company of Indiana

ACCIDENTS cannot always be prevented, as hidden defects will develop to the breaking point before they can be detected. Proper inspection, however, will prevent most accidents and careful planning for the future will eliminate 80 per cent of what inspection fails to find.

The cost of a great deal of maintenance work can be lessened by doing the work before the life of the material is all gone, but a great cost can be burdened on a property by replacing machinery just because it has been in service for a certain number of years. We are justified in replacing the axles of the high-speed interurban cars after they have been in service for a given number of miles, for we know by experience that there is an average life of an axle beyond which we ought not to go because of the great danger to life and property if they should break, but we would not be justified in renewing all the tubes of a boiler just because they have been in service twenty years, for they may give many years of service, and even if one should give way it seldom results in more than the loss of the one tube.

The renewal of a few rows of blading in a turbine at an expense of say $2,000 may easily prevent an accident in which perhaps all of the blading is ruined and which will cost many thousands of dollars, with a possible interruption of service.

How much better it will be to take a boiler off at stated intervals, thoroughly testing, cleaning and repairing, so that when it goes on it will be in first-class order, than to keep operating it until the efficiency drops to 30 per cent or a tube splits wide open with possible loss of life and interruption to service.

Just a few of the experiences of the writer are given below which I trust will be of interest to you.

Belts for Ash Handling: There have been a great many installations of belts for the handling of ashes, but in the writer's experience every installation has been a failure. One installation that we have in mind is where there were sixteen boilers and a system of 24-in. belts was put in to deliver the ashes to an elevator. This system consists of five different belts, four of these running parallel with the boilers and delivering to a cross belt which delivered to the elevator. This system was operated about one year and then discarded and the Irish buggy used in its place. During the period of operation about $7,000 worth of belts were used, with about 30 per cent efficiency in labor while operating the belts. There was excessive maintenance of these parts in the few months' use of this system besides the belts, so that all together it was a very expensive experiment.

The one great trouble with the system was to keep men from pulling hot ashes onto the belt. All kinds of schemes were tried for quenching the ashes, but in spite of all that we could do by threats and discharges the men would persist in burning the belts so that in a short time they would have to be renewed. Of course while we were working on the belts or machinery the most of the laborers would be idle, waiting for the system to start. Sometimes the basement would be nearly full of ashes and then it would take excessive labor and several days' time to get cleaned up again.

On account of the small capacity of the ashpits it was necessary to run two crews, night and day, on this work and this required about twenty-five men. After the belts were taken out and wheelbarrows used we decided to get more capacity in the ashpits, which was done. Now on a twenty-four-hour run one crew of nine men takes care of all the ash handling, using wheelbarrows, where formerly we had twenty-five men on the belt system.

There was also another feature of great importance in connection with this story, and this was the burning of stoker dump grates, due to shallow ashpits and the failure of the belt-handling system. However, the capacity of the ashpits was increased and the method of handling ashes was more efficient, our troubles disappeared entirely, so that we had much more satisfactory operation with a splendid saving in cost of labor.

Engine Crosshead Failures: Cast-iron crossheads on engines that have been in service for fifteen to twenty years should be closely watched, for there is very likely to be a failure of the threads in the crossheads where the piston rod screws in.

Taking charge of some old engines, I have found some conditions that were startling and proved to be narrow escapes from serious accident. Just one illustration is all that is necessary, which was on a 26-in. cylinder operating at 150 lb. steam pressure, where we found the threads in the crosshead practically broken off, just a few threads holding, so that the least shock from water or foreign matter would have stripped the rod out of the crosshead, with the result that we would have had an engine wreck of serious nature and possibly loss of life. Piston rods should be screwed out of crossheads often enough to make sure that they are in good condition.

Condenser Suction Pipe: Long lines of suction piping on jet condensers often are the cause of a great deal of trouble with the pumps attached to this line, as a very small leak of air into this line will cause serious trouble. The writer has had two separate systems of piping that were the cause of a great deal of trouble. One of these lines was a 20 in. riveted sheet iron pipe with steel wrought flanges, partly underground and about one-half exposed, but in the basement and in close quarters. To this line was attached four marine type condensers, and just as soon as we began to have trouble with our condensers our first thought was of the suction line and there was where we usually found trouble.

In another case we had five marine type condensers connected to an underground section line which was made up of bell and spigot pipe with lead packed joints, where we could not get any of the condensers to work satisfactorily. Investigation was started and before we completed the work we had dug up every joint on this pipe and caulked and packed every one of them. After this was done and the condensers overhauled either one of the condensers would pull down the required vacuum without any trouble at all.

Our method of discovering the leaks was to put a blind flange in as close to the source of water supply as possible and by having a water connection we could pump up about 40 lb. of pressure on the line and keep on making these tests until everything tested tight. Suction pipe to any kind of a pump should be absolutely tight, but where it is used for condenser purposes it is necessary that it be kept in perfect condition all the time.

Feed Water Treatment: Water for boiler purposes should be as near pure as it is possible to get it; in fact, if we could get distilled water it would be much better.

Water softeners, either hot or cold process, will give good results; neither one of them will give absolutely pure water, but will give water that will enable a plant to operate satisfactorily, even with very bad water before treatment. Care must be exercised in starting a softening plant where the boiler has been in service a number of years, using bad water, for every time the water is started in too soft the scale will be thrown from the tubes and great damage done by the consequent burning of the tubes.

As an illustration we cite one case where soft water has caused a great deal of harm. The softener system had been operating for some time, using a certain amount of lime and soda ash to take care of a creek water under certain conditions. It happened that a rainy season came on and it rained for about a week, with the result that the hardness in the creek was reduced considerably, but there was no change in the amount of lime and soda used. The result was that the water was reduced to a very soft state with a surplus of soda ash going into the boilers, which resulted in the throwing down of a lot of scale, which lodged in the lower tubes of Babcock & Wilcox boilers. The result was that a large number of them were burned and several boilers were put out of commission, so that the plant ultimately was in danger of interrupted service.

The remedy was to stop the treatment for several days, which at once cleaned up the situation and our tube trouble was stopped, the softener was put back in operation again and the treatment watched closely. Water softening systems are just like everything else about power plants, they must be closely watched, and it must be by some one experienced in the business if you expect to get results.

Increasing Capacity of Ashpits: In a certain plant the writer found that the ashpits under a certain grate stoker had not more than a four-hour run capacity, so that two crews of men were needed to handle coal and ashes, one crew for day and one crew for night, the men working in ten-hour shifts.

These ashpits were worked over and the capacity was increased so that they will hold a thirteen-hour run. After the change was made one crew of eight men and foreman do all the work in a ten-hour shift, saving the wages of seven men. This is a case where the saving in labor pays for the cost of making the improvement in four months' operation.

We do not often find where it is possible to make such valuable improvements in operating conditions as in this case, but there are no doubt cases of a similar nature where if the operating men would only present the matter in a correct manner the management would be only too glad to make the improvements.

In closing I wish to suggest to you that if you would but look about your power plant you will find where you can make changes in methods of operation or in changes of equipment that will save money, and if you are working for a public utility, whether it be an interurban, street railway, light and power, gas or heating, you should be even more diligent in this matter, for these interests are trying to serve the public under adverse circumstances and are expected to give service with a limited provision for the paying of the bills. Every operating man should have before him the slogan of safety, service and economy, and the greatest of these is service.

Utilities Present Coal Arguments

Representatives of Utility Associations Urge Continuation of Priority Order for Coal—Commission Extends Order to Aug. 19

NOTHING short of assigned cars at the mine will meet the serious situation in which public utilities find themselves as a result of the condition of the coal market. This was the point which representatives of the public utilities tried to impress upon the Interstate Commerce Commission on July 10 when a hearing was held on the supply, exchange, interchange and return of open-top equipment. As the commission was entirely familiar with the situation, only brief mention was made of the restrictions under which public utilities operate and which prevent them from competing with the luxury manufacturers or other consumers whose costs for coal bear a much less important relationship to their profits than is the case in furnishing public service. It was pointed out that deliveries on contracts are lagging behind from 40 to 50 per cent. Since these contracts were made to cover practically the entire fuel needs of the year, the public utilities are in no position to protect their fuel supplies except to make purchases in the open market at prices which are almost prohibitive, when their fixed income is taken into consideration.

The presentation for the American Electric Railway Association was made by E. B. Burritt, for the National Electric Light Association by J. W. Lieb and for the American Gas Association by Oscar H. Fogg.

The industries which use open-top cars made strenuous appeals for modification of the order, so as to allow the use of a limited proportion of open-top cars for their more essential purposes.

Representatives of the coal operators contended that the only way to meet the present situation is by mining more coal, which can be done only when the mines have an adequate car supply.

On July 13 the commission extended the life of the coal priority order for an additional thirty days from July 21. The extension is amended so as not to include flat bottom gondolas of certain measurements, these cars being automatically released to the service of steel building trades and certain other industries, but not to buildings, roads and some other construction industries. There is to be discrimination as to the assignment of the cars, public service utilities being preferred, and reconsignment is condemned except in unavoidable circumstances.

Bituminous coal interest representatives agreed that with the exception of the amendment the order is a good one and will do much toward solving the present serious coal problem.

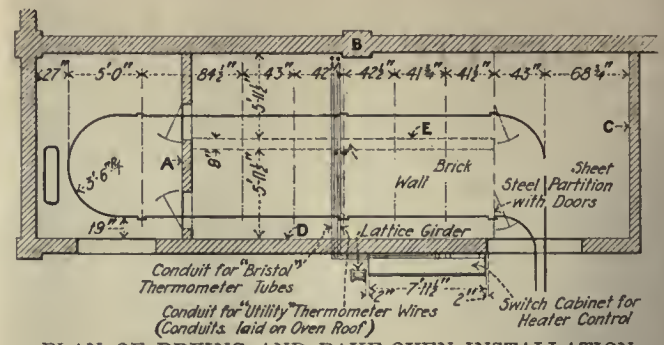
The Schuylkill Railway, Girardville, Pa., is installing a telephone dispatch system over its entire property. The wires are being placed on the 6,600-volt high tension poles and are properly protected with fuses ahead and behind. Telephone instruments are being located at each turnout in an iron box with the proper switch lock, to which each conductor carries a key. When completed jack boxes will be located at convenient points between the regular telephones and each car will carry a phone with an extension cord. The Kellog 2,500-ohm 5-bar ringer instruments are being used.

Repair Shop Has Efficient Armature Bake Oven

Pittsburgh Railways Reconstructs Armature-Coil Drying Room into High Temperature Armature Bake Oven

AT THE Homewood shops of the Pittsburgh Railways there has recently been put into service a drying, dipping and bake-oven combination which is simple, handy and very satisfactory. The former practice of the company was to dip and dry the armature coils in a room heated by steam before placing them on the armatures under repair. The present arrangement has been built in the same space formerly occupied by the coil-baking chamber.

Referring to the accompanying floor plan, all of the brick walls shown there with the expection of the one marked *E* were already built as a part of the coil-drying plant. The coil-drying room was the one bounded by the walls *A*, *B*, *C*, *D*. The floor of this room is an iron grating, under which are installed a large number of



PLAN OF DRYING AND BAKE-OVEN INSTALLATION

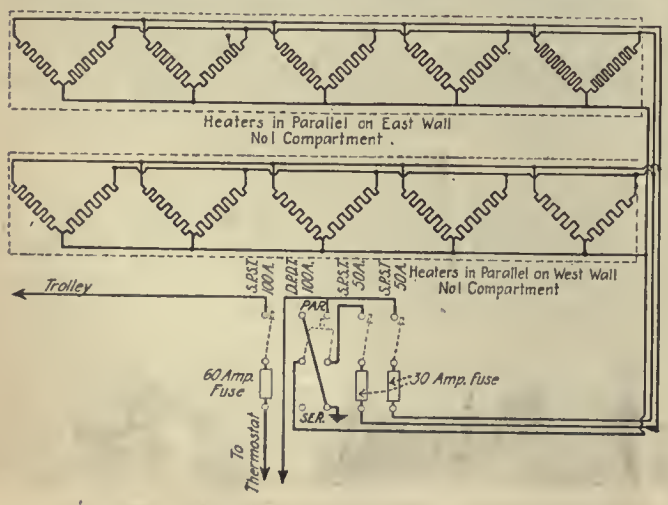
brought to this rail by the usual air hoist and transferred to hangers which follow the trolley rail. Armatures are left hanging on these hangers from the trolley rails in both the drying rooms and baking rooms for the necessary baking period. In the dipping room a turntable with an air hoist is installed. This takes the armature from the hanger, lowers it into the dipping tank, which is large enough for three armatures, and is then available for raising from the dipping tank to the



AT LEFT, TURNTABLE WITH AIR HOIST IN DIPPING ROOM. IN CENTER, DRYING ROOM. AT RIGHT, GENERAL VIEW OF ENTRANCE AND SWITCH AND INSTRUMENT CABINET

steam pipes. When it was decided to make an armature bake oven, to operate at higher temperature, the wall *E* was built and also the sheet-steel partition with doors. Electric heating was then installed in both of the small rooms thus formed, one room being for drying the armatures before dipping and the other for baking them after dipping.

In order to facilitate the handling of the armatures a trolley rail was installed as shown. Armatures are



WIRING DIAGRAM OF HEATER CONNECTIONS

hanger when the armature is ready to go ahead into the baking room. This turntable and hoist have proved of great convenience.

The practice is to dry the armatures in the drying room for about six to ten hours at a temperature of 90 deg. C. The armatures are left in the dipping tank about fifteen minutes and are then taken to the baking room, where they remain approximately eighteen hours at a temperature of about 120 deg. C. The temperature in these two rooms is regulated by means of ten heater units, such as shown in the accompanying sketch. Five of these heater units are on each wall of each compartment, the five in each case being connected in parallel. The heaters themselves consist of six Cutler-Hammer space-heating units, connected three in series, and the two sets thus created can be connected either in series or parallel for high or low-temperature regulation. Switches and temperature-recording instruments are mounted in a cabinet near the entrance door to the bake oven, as is also the equipment necessary for effecting heat regulation.

Since this outfit was put in operation, Nov. 1, 1919, the Pittsburgh Railways has found the results to more than justify the installation. The arrangement has also served as a model for two or three other railways whose equipment superintendents have happened to hear about it and see it and these details are given in hopes that they will be of assistance to others.

Convenient Circuit-Breaker Calibrating Outfit

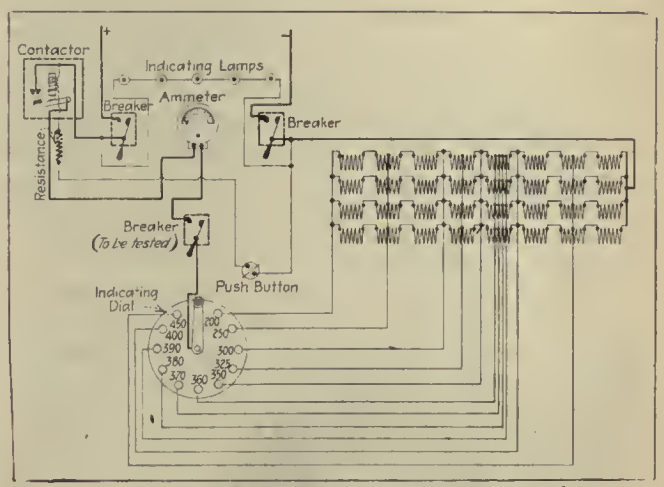
The Third Avenue (New York) Railway Has Replaced a Temporary Water Rheostat with a Permanent Circuit-Breaker Calibrating Apparatus Using Grid Resistors

By H. J. KROMBACH
Assistant General Foreman Third Avenue Railway, New York City

FOR years the circuit breakers used on the cars of the Third Avenue Railway of New York City were tested by means of a water rheostat. The success obtained was only partial and depended to a large extent on the man who was making the test. The difficulty encountered was that after testing one or two breakers the water in the water rheostat would become so hot that it had to be drawn off and replaced with fresh, cool water. If too much water was added the resistance would be too great and it then had to be reduced by the addition of salt. As the water increased in temperature more of the salt would be taken into solution, with a resulting decrease in resistance. Under these conditions it was practically impossible to get an accurate reading of the ammeter, as it was absolutely necessary that the time when current was flowing through the water rheostat be made as short as possible. Often the breaker under test would "blow" before the hand of the ammeter could reach its proper point. When an experienced man made the test conditions were not so difficult, but to break in a new man on this work was difficult, and many complaints were received from car operators that the breakers would not hold in or that they would not blow at all.

To remedy these conditions a new circuit-breaker outfit was constructed and installed in the Sixty-fifth Street shop which has proved entirely satisfactory. Accompanying illustrations show the apparatus used, the method of supporting the resistors and a diagram of connections for the outfit.

Referring to the diagram of connections, the path of the current may be followed from the positive line to a circuit breaker, installed as a matter of precaution, and then to a contactor whose operation is controlled from a push button by the man making the test. He can thus open and close the circuit readily and without danger of the current remaining on too long. With the



CONNECTIONS FOR CIRCUIT-BREAKER TESTING

controlling contactor closed the path of the current is from this contactor through an ammeter showing the value of the current and then to the circuit breaker under test. From this circuit breaker the current passes to the contact arm of an indicating dial rheostat. This contact arm can be turned to any contact desired. The value of the current that will pass through the breaker with the contact on any point is stamped on a small brass plate and fastened near the contact.

By means of this dial the various steps of grid resistors are cut out. These grid resistors are some car resistors which were available. After passing through the resistors the current passes through another circuit breaker installed on the negative side of the line and then to ground.

The indicating dial was constructed in the railway shop and is made of 1 in x 18 in. x 18 in. slate. Threaded brass contacts pass through this slate and



CIRCUIT-BREAKER TESTING OUTFIT AND METHOD OF SUPPORTING RESISTORS

the wires for connecting to the resistors are fastened to the contacts. With the first installation a snap switch was used for energizing the contactor, but it was found that occasionally the operator would forget to turn off the switch and the contactor would thus remain closed, so this was later replaced by a push button having a rather heavy spring. It is thus necessary to hold the push button closed to hold the contactor in. At the top of the illustration showing the circuit-breaker test five incandescent lamps will be seen. These are connected as shown in the diagram and their purpose is to warn the operator whenever current is on.

The rheostats are placed on three I-beams which rest on girders near the ceiling. In this location they are out of the way and any heat generated is made use of in heating the shop. The connection of the grid resistors is shown in the diagram. Five hundred and seventy-six resistance grids, each of 0.074 ohm resistance, were used.

It will be noticed that the circuit breaker shown as being under test in the illustration is located in a position in which it would ordinarily be if installed on a car. Additional brackets will be seen just underneath the circuit breaker. Some cars have the breakers hung in an upright position, but on most cars they are suspended with the face downward. Experience has shown that breakers should be tested in the same position in which they are installed on cars, as the effect of gravity on the moving parts is sometimes quite marked, and by testing breakers in their regular operating position danger of wrong calibration is eliminated. All breakers on the Third Avenue Railway equipment are set to blow between 390 and 400 amp.

With the new testing outfit any shopman can be used for this work, while previously it was necessary to have an experienced man. No complaints have been received regarding the setting of circuit breakers since this test outfit was installed.

Pulling Pinions Off Safety Car Armatures

ACCOMPANYING illustrations show a type of pinion puller which is being used by the Connecticut Company for the removal of pinions from General Electric type 258 armatures. The pinions on these armatures are so close to the end bearings that it is difficult to get anything back of them which will assist in their removal. This type of puller is arranged to slide over the pinion and by giving the puller a slight turn the notches in the puller slide behind the pinion teeth. By screwing the puller in it is pressed against the pinion seat of the armature shaft and will not damage the threads or the center of the shaft. When this has been screwed down fairly tight the pinion can easily be loosened with a tap of a light hammer.

Auto Truck for Track Repairs

Analysis of Work Done and Cost of Using a Truck for Emergency Repair Jobs and Minor Track Maintenance

BY W. L. WHITLOCK
Superintendent of Way the Denver (Col.) Tramway Company

THE Denver Tramway Company has been using a 1-ton Ford Form-A-Truck for emergency track repairs and minor track maintenance work since 1916 and has found this a very useful addition to the way department equipment. This truck normally carries a crew of two men, but at present has in addition an apprentice track foreman, whose duties were outlined in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 21, 1920, page 380.

This crew takes care of the majority of emergency track repairs and has in addition a regular order of work on minor track repair jobs. The emergency work comprises the usual jobs confronting any track department and consists of repairing broken rails, broken culverts, spread track, water on track, high paving, switches in bad order and items of similar nature. The minor track maintenance work is routine trackwork covered by authorized work orders or instruction sheets and includes replacing bad order rails, repairing joints, repairing special work, guard rail repairs, culvert replacements, cleaning track drains, cutting jobs by use of oxyacetylene torch, replacing mate tops, small paving jobs and other items of regular track maintenance work. Sometimes a job arises that requires more than two men; in such cases extra trackmen are furnished. The track truck carries the following equipment:

1 oxyacetylene cutting outfit	1 ¾-in. drift pin
1 low hack saw frame	2 ⅝-in. drift pins
1 high hack saw frame	4 shovels, 2-lb.
1 "oldman"	1 lining bar
3 ⅞-in. bits	2 tamping bars
7 ¾-in. bits	2 torches
1 ⅝-in. bit	1 hand saw
6 ½-in. bits	1 water bucket
1 1-in. bit	2 ¾x30-in. switch bars
1 ⅞x¾-in. S wrench	1 trowel
1 ⅝x½-in. S wrench	1 gage, 56½ in.
2 ¾-in. track wrenches	1 track broom
2 ⅞-in. track wrenches	1 sledge
1 1-in. track wrench	2 spike mauls
1 scratch hammer	1 ¾-in. track punch
2 2-in. machinist's hammers	4 picks
1 100-ft. tape	2 claw and nipping bars
1 ratchet	2 track jacks
1 frame for ratchet drill	2 red lights
12 hand chisels (2 bent for mate tops)	1 axe
5 track chisels	1 adz
1 center punch	2 scrapers
1 monkey wrench, 12 in.	1 gage, 42 in.
1 ¾x14-in. round file	1 grease bucket and dauber
1 1x½-in. round file	1 "Jim Crow"
2 oil cans	1 chisel bar
1 gas pipe pliers	4 doz. hack saw blades
2 ⅞-in. drift pins	1 ⅞-in. track punch

The truck was weighed recently to determine exactly how much load it was carrying and it was found to weigh 5,200 lb., which is "going some" for a 1-ton truck. Certain material was removed to lighten the truck, but it still carries a heavy overload. Periodical checking



REMOVING A PINION FROM A SAFETY CAR ARMATURE WITH NEW TYPE PINION PULLER

up by the department head is recommended, as trackmen are human and accumulate things they "may need some time."

Experience demonstrates that a 1½ or 2-ton truck should be purchased to replace this 1-ton truck in a very short time.

The following is a summary of the operation of this truck during December, 1919, and January, 1920:

TABLE SHOWING MONTHLY RECORDS OF MOTOR TRUCK

	December, 1919	January, 1920
Performance data:		
Days worked	28	29
Locations worked on	96	105
Total hours worked	599	730
Average locations per day	3.42	3.75
Average hours per locations per day	6.23	6.95
Total number man-hours per day	21.39	25.17
Work done:		
Broken rails repaired	31	31
Spread track repaired	8	3
Special work repaired	27	28
Cutting torch jobs	24	18
Miscellaneous	15	35
Total	105	115
Operating data:		
Total cost operation, maintenance and depreciation	$170.53*	$ 72.01
Miles run	603.00	568.00
Cost per mile	$0.2828	$0.1268
Gallons of gasoline consumed	82	72
Miles per gallon	7.36	7.89
Average miles per day	21.53	19.58
Average miles per job	5.74	4093

* Heavy repairs included in tbis item.

The cost of operation and maintenance for the years 1918 and 1919 was as follows:

TABLE SHOWING YEARLY DATA OF MOTOR TRUCK

	1918	1919
Miles run	4,984	5,551
Cost per mile	$0.1422	$0.1856
Gallons gasoline consumed	829	697
Miles per gallon	6.01	7.9
Total cost per year	$708.85	$1,030 48

New Signals at Anderson

Union Traction Company of Indiana Installs Overhead Contact Type Signals with Car-Counting Control on Busy Line

THE Union Traction Company of Indiana has a single-track block in Anderson, which is on the main line to Indianapolis. The block extends on Nichol Avenue or Eleventh Street, between Johns Street and Meridian, which is the principal business street of Anderson. This block is used jointly by a local one-man car line carrying the sign Hazelwood, giving frequent service, and also by interurbans between Indianapolis and Muncie, there being often following movements through the block. The two ends of the block are not mutually visible, and there is, furthermore, a railroad crossing within the block near the west end. To protect this traffic the railway company installed permissive signals of the overhead contact type having car-counting control, made by the Nachod Signal Company, Inc., Louisville, Ky., and known as type CD.

Referring to the accompanying plan, at the Meridian Street end the standard signal layout is used, with contactor 3 on the curve in advance of signal B, and contactor 4 on Eleventh Street, cars ordinarily entering the block by contactor 3 and leaving by 4, although both these contactors are directional and may be operated either way if desired.

The office of the dispatcher for the interurban cars is on the sixth floor of an office building near Eleventh and Meridian, as shown, from which he can view a great part of the block, though from his elevation he cannot see signal B itself. A repeater RB of signal B is therefore mounted considerably higher up on the same pole and directed along the dispatcher's line of vision.

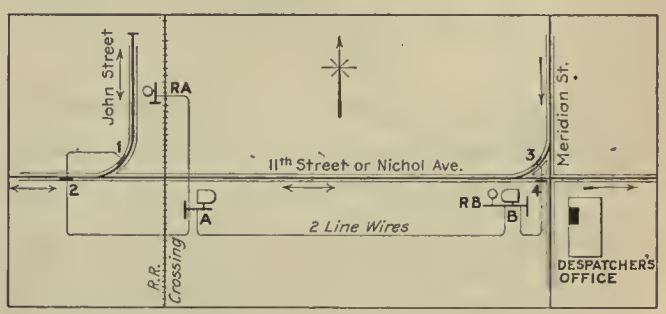
At the west end of the block at Johns Street the signal layout is suited to the reversed single end passing switch used there, with contactor 2 on the main line in advance of signal A, contactor 1 on the spur, and repeater signal RA to repeat the indications of signal A, so placed as to be observed by the motorman while he is on the spur.



SIGNAL INSTALLATION AT JOHNS STREET

A westbound car, for instance, enters the block, and in passing under contactor 3 sets signal A at "stop" and signal B at "permissive," the normal indications of both signals having been "neutral." This change takes place in the sight of the motorman. Should an eastbound car now approach Johns Street the motorman will observe signal A at "stop," and will, therefore, take the siding, passing under contactors 2 and 1 in succession. These contactors are so connected that a car passing eastward under 2 counts into the block and eastward under 1 counts out again. On account of the reversed direction of the spur it is necessary for the car to pass through the part 2-1 of the block in order to get in the clear and this is the novel feature of the layout.

The motorman of the second car waits until the first has passed westward under contactor 2 and cleared the signals, which he observes on repeater signal RA. As he backs further under contactor 1 he sets the block for his direction of movement, setting signal B "stop," signal A "permissive," and observing this on signal RA. He passes through the switch and goes eastward on Nichol Avenue without touching contactor 2, which is set sufficiently far from the switch point.



TRACK DIAGRAM OF SIGNAL INSTALLATION

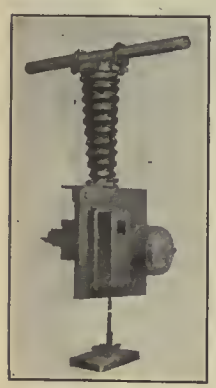
The signals are car-counting, and if the Hazelwood local follows the interurban the signals will not clear or permit an opposing movement until both cars are out of the block, the counting relay having a capacity of 15

cars. The signal indications are given by lights behind colored lenses, reinforced by opaque color disks behind clear glass roundels, both indications are relay, being enclosed in a cast-iron case and hung on a leveling bracket attached to the wood pole, as shown in the accompanying illustration. All power to light the signals and operate the relay is taken from the trolley and the relays are operative down to a line voltage as low as 250. A junction box is mounted lower down on the pole for manual control of the signals if desired, to localize the circuits for test through disconnecting switches and to house the fuses.

The contactors are of the electrical type, being merely contact strips supported near the wire, but insulated from it and bridged by the flanges of the wheel on the trolley wire as it passes under the contactor. Two line wires run through the block connecting signals A and B and two wires run from the contactors to each local signal.

High-Voltage Overload Relay

FOR the protection of high-voltage alternating-current circuits of 100 amp. or less the Westinghouse Electric & Manufacturing Company has developed the type CB overload relay, which precludes the use of high-voltage current transformers. The relay is designed for indoor use and is arranged for pipe mounting, as shown in the accompanying illustration. It consists of a circuit-closing element operated by means of a standard current transformer, an overload relay and a special transfer relay through a micarta chain of such length as to provide ample insulation for the voltage in use. The three units just mentioned are mounted on one base, which is in turn supported from an insulator. The overload relay has a 4 to 12 amp. range and a 2-second inverse-definite-minimum-time limit. The operation of this relay serves to close the circuit of the releasing coil on the transfer relay.



A.-C. OVERLOAD RELAY

The current transformer can be used on all voltages, since it is thoroughly insulated from ground and from the remainder of the system.

Section Insulators for Reversed Potential

WHEN certain sections of the trolley were changed over to reverse polarity in connection with the extensive electrolysis investigation made in Omaha, Neb., in 1917, the positive and negative trolley sections were separated by a double installation of section insulators with a piece of dead trolley between, making a separation from live wire to live wire of 6 ft. This rather long dead section was installed to meet the objections of the linemen, who felt that they needed unusual protection in view of the 1,200-volt difference of potential between adjacent sections of the overhead. The insulators used were made of wood and it was found that they would sometimes carbonize and break down. The long gap was also a source of much trouble in operating the cars.

W. O. Jacoby, superintendent of electric lines Omaha & Council Bluffs Street Railway, has now replaced these section insulators with a single fiber insulator which gives a separation of only 14 in. from live wire to live wire. The objections of the men were satisfied when they were shown that in case of a trolley break at the section insulator they have to place their blocks to span the dead section anyway in order to make the repair, and that the use of a single section insulator of better grade would also mean they would have one less insulator to maintain.

New Shunts for Switchboard Use

ALTHOUGH the type G ammeter shunts recently developed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., are designed for use on horizontal busbars, they will operate in any position without overheating. The terminal castings of the 300 amp. shunts are slotted, to receive one ¼-in. copper bar per slot. Sizes ranging from 10 to 300 amp. are mounted on a light micarta strip which takes all strain from busbar distortion, from the terminal lug and manganin plate joint. These shunts operate at a temperature rise of 30 deg. C. if connected to busbars of ample conductivity when carrying two-thirds of their rated current, which should correspond to the normal full-load rating of the circuit. They are adjusted for 50 millivolt drop at full rated current and are interchangeable with other standard makes of the same rating.



AMMETER SHUNT

The resistance plates of the type G shunts have a negligible temperature coefficient and thermo-electromotive force, thus avoiding errors due to heating, which may amount to several per cent in other resistor materials.

Handling Hot Clinkers on Rubber Conveyor Belts

THE Standard Portland Cement Company, Leeds, Ala., uses a rubber conveyor belt for handling hot cement clinkers with a temperature of 200 deg. F. and over. In order to prevent scorching of the belt it was operated at an incline of 12 deg. and the lower pulley runs in a trough of water so that a film of cold water is carried upon the belt. It is impossible to cool the clinkers sufficiently before they are deposited in the loading hopper.

The joining of the belt ends to withstand the extremes of temperature and prevent wear of the pulleys is accomplished by the use of Crescent belt fasteners. The ends of the belts are brought tightly together in a snug joint, which makes the belt practically endless on the pulley side and there is no opportunity for clinker ash to get into the joint and cause abrasion of the belt ends. By the use of these fasteners no metal comes in contact with the pulleys to cause wear and a permanent joint is established.

In six months' operation this conveyor has carried 61,000 tons of clinkers. The belt used is Goodyear "Hy-Temp," which is made particularly to withstand high temperatures and is adapted for work on conveyor jobs where heat resistance and the ability to withstand hard wear are essential.

Bridgeport Restricts Jitneys

Important Meetings of City Council and Chamber of Commerce Precede Passage of Ordinance Eliminating Motor Buses from Streets with Tracks—Connecticut Company Agrees to Continue Service for Thirty Days

BRIDGEPORT, CONN., will not lose its trolley cars; that is, not at present. The Connecticut Company will hold off for at least thirty days on its threat to withdraw pendin a trial for that period of regulatory ordinance passed by the Council in the early hours of July 13 after a session which lasted five hours. The regulatory ordinance was passed by a vote of fifteen to seven. It eliminates the jitneys from the principal streets of the city, giving the jitney men routes running parallel in some cases with the trolleys.

The new ordinance took effect on July 15, the date on which the Connecticut Company had indicated it would abandon service unless some measure of relief was extended. The ordinance is an amendment of Section 3 adopted by the Common Council on June 23, 1919, by which the power to fix traffic routes in the city is placed in the hands of the Board of Police Commissioners.

President L. S. Storrs of the Connecticut Company said that the company would continue to operate for thirty days to see whether the jitney restrictions enabled the company to do business without a loss. The jitney men say they will fight to a finish. Mr. Storrs' statement to the Mayor follows:

Having given full consideration to your suggestions and having communicated with those of the trustees who can be reached, in reply I will say that we are uncertain whether such regulation of the jitney will in fact fully protect the company, but that if such ordinance be passed and be made immediately effective the company will postpone the discontinuance of service for one month in the hope that the ordinance, aided by strict enforcement of its provisions and of other existing traffic regulations, may prove effective and in the further hope that the citizens of Bridgeport may realize that patronage and fair treatment of the trolleys are essential to a final solution of the transportation problem of the city.

Conditions of New Regulatory Measure Stated

Section 3 of an ordinance entitled "An Ordinance Fixing Traffic Routes for Public Service Motor Vehicles as defined by Sec. 1523 of General Statutes of Connecticut, Revision of 1918" adopted by the Common Council at a meeting held on June 23, 1919, is amended by the Council to read as follows:

Sec. 3. The Board of Police Commissioners shall have power to fix the route over which public service motor vehicles shall operate in the city of Bridgeport, except in its public parks; and upon receipt of an application as above provided shall grant a written consent to operate over any one of the routes applied for as fixed by said board; provided, however, said written consent to operate over any route applied for may be denied by the Police Commissioners if, in their opinion, the granting of said written consent will result in excessive and unreasonable traffic on said route. If consent, as above provided, to run over any route is denied, the applicant may amend his application by specification of another route or routes, and such amended application shall be granted or denied hy said board as above provided. But said board shall not deny to any applicant consent to operate on some route if applied for; provided further that no consent shall be given to the owner of any public service motor vehicle to operate as such upon the following named streets within the designated limits: [Ordinance then designates streets.—Eds.]

Any written consent given by the Board of Police Commissioners heretofore for the operation of any public service motor vehicle, within the limits of these streets, from which said public service motor vehicles are excluded by the terms of this ordinance, is hereby revoked.

When granting such written consent the Board of Police Commissioners shall furnish to the applicant a number plate bearing the number of said consent, which the applicant shall display conspicuously upon his motor vehicle, when the same is operated in the city of Bridgeport, and said applicant shall pay to the city the cost of said number plate, said written consent to operate shall remain in force and effect until the first day of January next following the date when such consent was granted, and shall be renewed for a period of one year by the Board of Police Commissioners upon application of said owner or owners, for operation on route named in said consent, unless said Board of Police Commissioners, at time of such application for renewal shall be of the opinion that the issue of such renewal will result in excessive and unreasonable traffic on said route. Such consent shall be granted only to the bona fide owner of the vehicle, for which such consent is asked, and shall not be transferable. Such consent shall not be granted until the applicant has satisfied the Board of Police Commissioners that he can read and speak the English language sufficiently well to understand traffic rules and regulations and spoken directions of traffic officers. Such consent may at any time be revoked by the Board of Police Commissioners whenever such board shall be satisfied that the driver employed by the consentee does not understand the English language in compliance with the foregoing test.

Provided, however, that nothing herein contained shall prevent the holder of any such license from making application to the Board of Police Commissioners and securing as herein before provided, a written consent to operate a public service motor vehicle over such route or routes as are not denied by this ordinance.

This ordinance to take effect July 15, 1920. All ordinances or parts of ordinances inconsistent herewith are hereby repealed.

History has been made fast in the Bridgeport bus case since the company announced that the buses were carrying more passengers than the railway and that unless the conditions of competition were made more nearly equal the company would withdraw its cars from service. With the matter thus squarely put before it, the Council called a special meeting for the evening of July 12 to act on the matter. The Chamber of Commerce called a meeting for the same evening.

A special message was read to the Council by Mayor Wilson. In his message the Mayor expressed the belief that the motor bus would in time supplant the trolley. When that time arrived it would mean the granting of franchises to corporations for operating motor buses on city streets, but that "in the absence of such a responsible corporation for motor bus transportation in Bridgeport it is highly necessary, I believe, to retain primarily the trolley service." He thought that a *modus vivendi* could be arrived at between the motor bus operators and the company without detriment to either and that the types of motor bus or jitney permitted should be those with a seating capacity of twelve persons or more. He further believed that in the city there were a large number of incompetent drivers and recommended the appointment of inspectors to examine and certify drivers. He then suggested a list of streets from which the jitneys should be eliminated. He said that he had been assured that the restrictions he had outlined would enable the railway to continue the operation of cars. In conclusion he said:

The trolley company was granted a franchise by the State Legislature and in the nature of that grant it has a monopoly, and if it is to function in accordance with its intended purpose it must be relieved from unfair, unregulated, irresponsible competition.

With these restrictions put into effect Mr. Storrs advises me that the Connecticut Company will at once render adequate trolley service to the city.

It may be desirable to change some of these restrictions and I know that the jitneys and the Connecticut Company are both in a conciliatory attitude and will be pleased to meet in conjunction with such committee as your honorable body may deem wise to create, for the purpose of providing better transportation facilities for our citizens.

I recommend the appointment of such a committee.

It has been said very aptly that the 5-cent fare is an "accident in coinage," and in order to arrive at what would be a proper operating cost I would recommend that your

honorable body authorize the Mayor to appoint a committee of such size as he may deem wise for the purpose of considering and advising with the Connecticut Company in ascertaining what such fare should be. The Connecticut Company advises me that it has not, for the Bridgeport district, the per capita mile cost of its operation, which of course such committee must have. When this is arrived at the adjustment of the fare question is a simple matter.

After considering the matter of regulation in executive session the Council threw the meeting open. Mr. Storrs restated the case of his company substantially as he had done a few hours previously at the meeting of the Chamber of Commerce. The jitney men also had their session.

Chamber of Commerce Holds Meeting

The meeting of the Chamber of Commerce was open to the general public. It was addressed by President Storrs of the Connecticut Company, John Schwartz and William Clancy, representing the jitney men, and Walter Jackson. The chairman of the meeting explained Mr. Jackson's presence by saying that he had been retained by Mr. Lashar, a member of the Chamber and a prominent Bridgeport manufacturer, to report on the railway and jitney matter and that Mr. Jackson was present at the personal request of Mr. Lashar to summarize for the benefit of the audience the facts contained in his detailed report.

Mr. Storrs, the first speaker, said that his company had been invited to enter Bridgeport and had invested $7,000,000 in that city, $1,000,000 of which was tied up in street paving. He enumerated the various obligations of the company to the city with respect to monetary payments and said that up to 1916 the company had been able to operate at a profit in Bridgeport. Last year, however, the outgo exceeded the income by $170,000. The deficit of the company in Bridgeport for the first six months of this year was $300,000. The company must be permitted to earn sufficient to keep going. The company could not compete with the jitney on unfair conditions. He urged one regulated utility. In no other way could the city get adequate service. The only States in the East where cities had unrestricted jitney competition were New Jersey and Connecticut. The company wanted the jitneys restricted to the territory not now served by the electric railway and also wanted the jitneys eliminated from the central section of the city.

Mr. Schwartz asked that Mr. Clancy, though not a member of the jitney association, be permitted to address the meeting. Mr. Clancy's remarks were confined almost entirely to the drawing of a parallel which indicated that the doom of the electric railway was sealed. He said that any utility that saved time, developed industry, and could be operated at a profit eventually would prevail. From 70 to 80 per cent of the people in Bridgeport used autos. He considered that the conclusive proof of his argument.

Mr. Schwartz characterized the service of the Connecticut Company as unreliable. He also quoted the Mayor to the effect that it was the jitney that filled the bill in the war period. As for the burdens which the jitney now bore, Mr. Schwartz referred to the necessity of the jitneys paying a license fee for the chauffeur and a vehicular license and the owner paying a revenue tax. He also said that the owners of the 300 jitneys, costing from $2,000 to $6,000, were paying a property tax. Jitneys operated last winter during the snow and ice when the cars of the electric railway were not in service. Mr. Schwartz said that 80 per cent of the traffic between Bridgeport and Norwalk was handled by jitneys. While the trolley to Norwalk was tied up for four days during the winter the jitneys got through without serious interruption. The jitney men were responsible. They put through a liability bill themselves at the last legislative session. The jitneys settled accidents promptly. As for regulating the jitney Mr. Schwartz said that the factories were at the east and west ends of the town. There were only two streets on which the jitneys could run from one end of the town to the other and on both of these there were trolley tracks. He explained that the success of the jitney in Bridgeport was due to the fact that the Connecticut Company had not served the city adequately and that it had raised its fares in some instances to a point that became prohibitive.

Mr. Jackson said that if the trolley service had been adequate in Bridgeport there would probably have been little jitney competition. A large proportion of the traffic was for short distances, and short-distance riding had been greatly fostered by the jitney. He said that many industries in Bridgeport were at considerable distances from trolleys, and this fact had served as an opening wedge for the autos. He suggested the use of the auto as a complementary service to the railway. Should the trolleys be eliminated from Bridgeport the 5-cent fare on the bus would undoubtedly not remain. The present scheme of fare charges in effect on the lines of the Connecticut Company was not the most logical. It had been thrust upon the company by the Public Utilities Commission. For this the company should not be blamed. With restriction of the jitney to a supplementary service, the trolley could be run at a higher schedule speed with a possible reduction in fare. Mr. Jackson said that the base schedules of the electric railway should be provided with one-man cars; that all indirect service should be by motor buses operated in connection with the electric railway, and that most rush-hour service should be given with two-car trains.

At the conclusion of the meeting the following ballot was mailed to all the members.

Instructions—Please answer "yes" or "no" to the questions and return by next mail.

1. Do you favor action which would result in the cessation of trolley service and make us dependent on motor bus transportation?

(Answer) .....

2. Do you favor legislative action as recommended by the Mayor to the Common Council, which, in effect, will eliminate active jitney competition from the streets about the city's center on which the Connecticut Company operates trolley cars—this to be on guaranty of adequate trolley service.

(Answer) .....

3. Do you favor the ordinance under discussion by the Common Council as this referendum is being mailed, details of which will appear in papers of July 13?

(Answer this question only if ordinance shall differ materially from the Mayor's recommendations).

(Answer) .....

Connecticut Mayors Consider Matter

The executive committee of the Mayors' Association of Connecticut has also taken up the jitney matter. At a meeting in the Hotel Taft, in New Haven, on July 13 two self-explanatory resolutions were adopted and will be submitted for approval to the State association. They read as follows:

Resolved, That it is the sense of the Mayors' Association of Connecticut that the public must be protected and the best interest of the community conserved. To that end the public service vehicles should be regulated as to service,

schedules, rates, routes and liabilities as are the trolley companies. All municipalities should guard carefully their vested rights to regulate traffic and thus protect the safety of the general public; and be it further

Resolved, That the Mayors' Association of Connecticut invites co-operation with all municipal organizations and semi-public bodies interested in the welfare of their respective communities throughout the State to the furtherance of this end.

At a meeting of the Board of Aldermen at Waterbury on July 12 a committee was appointed to hold a hearing on July 14 to learn the views of representatives of both the electric railway and the buses. At the meeting on July 12 petitions were received from employees of the Connecticut Company in Waterbury, representing sixteen different departments and 600 employees, asking that the jitneys be restricted in their routes to streets not covered by trolley cars. The men argued that this step should be taken in defence of the company, which has threatneed to abandon service unless the competition of the jitney is restricted.

In New Haven it is said that the employees of the Connecticut Company, backed by the Connecticut Federation of Labor, with which the union of trolley men is affiliated, are also prepared to protest to Mayor Fitzgerald against the competition of the buses.

Restriction of buses somewhat similar to that intended to be imposed in Bridgeport went into effect recently in New London. The terms of the jitney ordinance in New London were reviewed in the ELECTRIC RAILWAY JOURNAL for July 3, page 34.

The Hartford Board of Aldermen, on the evening of July 12 passed a resolution proposed by acting Mayor C. D. Alden, Jr., "that the transportation problem of the city in regard to electric, taxicab and jitney service be referred to the standing committee on railways of

Trolley Service or Auto Busses?

How much longer will the People of New Haven, and Vicinity, and the Connecticut Company be subjected to the impositions of Auto Busses? What is going to be done about this very outrageous local transportation condition? It's high time to ACT!

Last winter!—Do you remember it? Do you remember how the Connecticut Company kept the tracks clear so that You could ride on the cars?

Do you remember how the snowplows struggled through the streets to keep the paths open? Do you remember how the car crews bravely stuck to their posts despite the freezing weather? You admired them, didn't you?

We did.

But—do you remember how the auto busses came out after we had cleared the tracks and deliberately ran in front of the trolley cars? How many busses were there on the streets of New Haven during the storm? Remember that?

How many auto busses are there on the streets of New Haven during any rainstorm? If auto busses are a logical means of local transportation why are they only on the streets when the sun is out or the streets dry?

If auto busses are a logical means of local transportation why have they been ruled from the streets of some of America's largest cities?

You give the trolley car company an exclusive franchise to operate a local transportation service—a trolley car system. The trolley car company lays expensive steel rails, erects trolley wires, puts cars on the tracks, and before the company has barely had an opportunity to pay a dividend—you allow auto busses to unfairly compete with the trolley.

Where's the justice of that?

Have you built a house on the outskirts of New Haven and had full city service and advantages? Have you thought about your taxes?

When a new addition to the city is opened up it is the trolley car company that is called upon to build a track to the new section to "help build it up." When it's built up who gets the benefit of the pioneering?

Do you suppose that you could call on an auto bus owner to operate his bus to and from some sparsely populated section of the city through Spring, through Summer, through Fall, and through WINTER? Would you practically ask him to operate at a loss until that section is a "paying" section?

It's been done with the Connecticut Company. And the Connecticut Company DID IT! Did it not from an altruistic standpoint, to be sure, but nevertheless DID IT, and because the Connecticut Company DID IT has the continued growth of New Haven in some sections been made possible.

The busses, of course—they're a bit "faster" you know.

And, too, it costs "less" to ride in an auto bus.

Does it?

No, it does NOT. If anything it costs a great deal more!

The Connecticut Company lays its tracks, puts up its wires, puts on an army of trolley cars. When the tracks wear out who puts new ones down?

The public?

No, the Connecticut Company.

The auto bus man buys a bus—either good, bad, or indifferent, and he's "ready for business." All he has to do is to follow behind, or as usual, run ahead of a trolley on any of the Connecticut Company's main lines. When the heavy, cumbersome auto busses wear out our streets—yours and ours—who pays for THAT?

The auto bus man?

No, not the auto bus man, but—YOU! The public pays for that. When they wear out a little more than usual then a little more taxes than usual is paid—that's all.

When the pavement between the tracks and for a distance on the outside of the tracks of the Connecticut Company are worn out by the auto busses who pays for the repairing?

The auto bus man?

The public?

NO, the Connecticut Company pays for it, even if never in its history it used that necessary pavement.

Where's the justice in THAT?

New Haven certainly does not want the same thing to happen that happened in Bridgeport—the issuing of a notice of removal of street car service. There is no sane reason why that should happen in any progressive city.

The Connecticut Company is sincere in its desire to serve the public. It is sincere in its wishes to serve quickly, courteously, economically—and SAFELY.

If the Connecticut Company must come to the same decision here as was made at Bridgeport it will do so, not because it wants to, but because it was FORCED to.

The Connecticut Company has always endeavored to give 365 days of uninterrupted trolley service every year.

It does not run on a haphazard, sunshine, intermittent schedule.

And this coming winter, if the Connecticut Company is still operating its trolley cars in New Haven, we will again try to keep the lanes of street car traffic open. We will again do our very best to give the very best for the very least.

We will in the future, as in the past, try, in so far as our finances will permit, to replace our rails as they become worn, and replace our cars as they become worn, in order to continue giving you service. REMEMBER that trolley fares are the only source of revenue the Connecticut Company enjoys from its passenger service.

And the Connecticut Company will go on paying for that work THEMSELVES, and they will go on paying the taxes levied on them by the city.

Now, what are YOU going to do? You've our side of the story. Are you going to remember past performances? Don't forget the story of the grasshopper—he didn't prepare for the winter.

Do you realize that the unfair competition of the Jitney has been one of the largest factors in bringing the Connecticut Co. face to face with bankruptcy and has therefore forced it in self-defense to increase its fares?

Don't forget last winter! If there is no trolley service this winter, what will you do?

The Connecticut Company

TEXT OF A FULL PAGE ADVERTISEMENT CARRIED BY THE CONNECTICUT COMPANY IN THE NEW HAVEN PAPERS LAST WEEK. SIMILAR ADVERTISEMENTS APPEARED IN OTHER CITIES, SUCH AS HARTFORD AND WATERBURY

the board with instructions thoroughly to consider the situation, to hold such hearings and make such reports from time to time . . . as the said committee shall deem desirable in connection therewith, it being the intention hereof that any such regulation or problem be treated with moderation and deliberation and in a manner fair to all involved in any such regulation or problem."

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Exhibit Committee Optimistic

THE association exhibit committee met Tuesday, July 12, at the association headquarters in New York City. Although late in getting out the space application blanks this year, the returns have come in promptly. More than 40,000 sq.ft. of space has already been sold. This amount is two-thirds of the total area sold last year. Old exhibitors are taking additional space and indications point to a very successful exhibition. In order to expedite freight deliveries each member of the committee proposed to co-operate with the manufacturers in his district for making shipments in groups and to facilitate deliveries to the pier.

Fred C. J. Dell and George W. Wells were appointed members of a sub-committee on space assignment. The space rate this year is 60 cents per square foot. A subcommittee on decorations was appointed, consisting of S. D. Hutchins, chairman; L. W. Shugg, A. M. Robinson and A. N. Davis.

Those present were Frank H. Gale, chairman, General Electric Company; John Benham, International Register Company; Frank C. J. Dell, National Railway Appliance Company; S. D. Hutchins, Westinghouse Traction Brake Company; John B. Kilburn, Hale & Kilburn Corporation; J. C. McQuiston, Westinghouse Electric & Manufacturing Company; A. M. Robinson, J. G. Brill Company; E. F. Taylor, Texas Company; L. W. Shugg, General Electric Company; Secretary E. B. Burritt, and George W. Wells, manager of exhibits.

Committee on Code of Traffic Principles

A MEETING of the Transportation & Traffic Association committee on code of traffic principles met Wednesday, July 13, at the association headquarters in New York City.

The committee put in a long day's session discussing the elements of a model traffic ordinance by comparing ordinances proposed by committee members and those of representative cities and expects to present valuable material to the convention. Those present were H. B. Flowers, chairman, and W. H. Maltbie, Baltimore, Md.; Fielder Sanders and P. E. Wilson, Cleveland.

Announcement has been made that the midsummer meeting of the Illinois Electric Railways Association will be held at Springfield, Ill., July 30, 1920. A tentative program calls for a business meeting in the morning, a convention luncheon at noon and a handicap golf tournament in the afternoon. The detailed program will be announced later.

Trainmen's Assignment Board

Complete Record of Men and Their Daily Activities Available at a Glance in Houston Electric Company's Office

THE Houston (Tex.) Electric Company has found it valuable to both the trainmen and the superintendent to maintain a bulletin board on which the names of all trainmen are so posted that the duties or assignments which they have for the day can be seen at a glance. This consists simply of a blackboard hung in the superintendent's office, on which the numbers of all runs are painted and rows of pegs provided for attaching the small cards bearing the trainmen's names opposite the run number to which they are assigned. Odd run numbers on the board designate daylight runs and even numbers night runs. There is also a color scheme of cards and lettering which assists



TRAINMEN'S ASSIGNMENT BOARD USED IN HOUSTON, TEX.

in classifying the men. A black card with white lettering designates a conductor; a black card with yellow lettering designates a motorman; a white card with black lettering indicates a safety-car operator who was formerly a conductor; a yellow card with black lettering indicates a safety-car operator who was formerly a motorman.

At 5 o'clock each afternoon the cards are properly arranged on the board to indicate the assignments for the next day. As the men come in off their runs they consult this board and note the run assignment for the next day and the time at which they must show up the next morning. When they report in the morning there is a form ready for their perusal on which is written, opposite the run number, the car number, leaving time, carhouse track on which the car is located and a check column in which they sign.

In addition to the run number assignments, the trainmen's board shows the unassigned extra men, men excused from duty, on sick leave, etc., so that every employee of the train service can be accounted for by observing the board.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

$1,000,000 Transmission Line

Toledo Railways & Light Company Has Awarded Contract for Twelve-Mile 60,000-Volt System

The Toledo Railways & Light Company, Toledo, Ohio, has closed contracts for the building of a high-tension overhead power transmission line to circle the city of Toledo for the most part adjacent to the right-of-way of the Toledo Terminal Railroad, which at the present time connects up all of Toledo's twenty-three railroad lines into one system for interchange business and factory development. The new transmission line will be carried on specially constructed steel towers, averaging 65 ft. in height and consisting of two circuits designed for about 65,000 volts and 80,000 h.p.

Will Encircle the City

The power will be manufactured at the Acme Power Company's plant on the East Side. The line will extend from there to the corner of Front and Dearborn Streets in the city, thence to the Terminal Railroad. It will cross the Maumee River on high towers approved by the United States government. From the river it will extend along the Terminal belt line to Fitch, a station at the intersection of the Terminal and Toledo & Western Railroads. This is a distance of nearly 12 miles and is almost half of the city circle. From this point it is joined with the line extending to the city filtration plant in the southwest corner of the city. The closing of the gap in the rest of the belt will be made as soon as industries develop in the southeast part of the city.

The new line will furnish the power for the city's water system and also for a new sewage disposal plant to be built soon.

The new line is estimated to cost approximately $1,000,000, and although plans and work of securing right-of-way have been in progress for almost a year, the actual work will be started this summer.

Auto Company Largest User

The city of Toledo at the present time probably has more mileage of underground high-tension cables and transmission system than any other city of its size. By building a duplicate high-capacity line, the Rail-Light feels that it will provide Toledo industries with the maximum safeguard for continuous power supply so essential to efficient operation.

Most railroads and industries have shown a spirit of co-operation in the work of getting the right-of-way for the new power line. A few pieces of property will have to be condemned.

The new line will furnish power for practically 85 per cent of Toledo's industries. The largest user is the Willys-Overland Automobile Company.

Power for the operation of the Ohio Electric Railway between Toledo and Lima and for the Toledo & Western Railroad between Toledo and Pioneer and Adrian, Mich., will be transmitted over the new overhead high tension line. Many cities along these lines are supplied with light and power by the Rail-Light through these connections.

The steel towers are being built by the American Bridge Company, a Toledo concern, and the work of construction has been awarded to A. Bentley & Sons Company and several other Toledo contractors.

Missouri Short Line Arranges for New Terminal

The Kansas City, Clay County & St. Joseph Railway will use a new passenger terminal in Kansas City, Mo., now being equipped. It is located in the Railway Exchange. During the war the ground floor was occupied chiefly by the railroad administration's joint ticket office. Since the war ended tenants not connected with steam railroad enterprises have been eliminated. The Kansas City, Clay County & St. Joseph Railway had its headquarters in a suite on the fifth floor of this building; its passenger station was at Thirteenth and Walnut streets, six blocks south. A five-year lease of the Railway Exchange has been secured.

The company has leased four rooms on the ground floor of the building, facing Seventh Street, including a corner room on Grand Avenue. All entrances from the large lobby of the Railway Exchange are being sealed, so that patrons will enter the station from the street fronts only. The interurban company is equipping excellent waiting room facilities, with toilets and washrooms for men and for women. The baggage room is being provided with manual trucks, so that baggage will be handled direct from the baggage room to the car.

The freight terminals of the company are only a few blocks north of the new passenger terminal, where the company has its own tracks; its shops and carhouses are a few blocks further away, across the Missouri River, in North Kansas City.

Another advantage is that practically all passengers will hereafter board the cars at the passenger terminal.

Terms of Akron Settlement

City Council Outlines to Railway Amendment to Franchise as Basis for Compromise

On July 10 the utilities committee of the City Council of Akron, Ohio, sent a communication to the Northern Ohio Traction & Light Company, outlining an amendment to the franchise which it is willing to make to the main body. This provides for a straight 5-cent fare for three months, during which an effort will be made to arrive at some conclusion for a permanent franchise with a sliding scale to take care of the expenses and returns on the investment of the company. The proposal follows:

> Our committee will recommend to Council that the present franchise be amended by substituting a 5-cent cash fare for the present rate for a period of three months, after which the present rate shall again prevail; if a new franchise has not been agreed to by that time but progress has been made toward that end, the same arrangement shall be continued for a further period of three months.
>
> Our committee will further recommend to Council that when a new franchise is drawn it shall provide for an initial rate of fare of 5 cents and shall be increased or decreased at stated intervals, after sufficient time for and when an audit of the company's books and records is had, as the necessity for such increase or decrease may appear, having in mind finding a rate of fare at periodic increases or decreases of one cent each that will provide revenues sufficient to meet operating expenses, depreciation and a return on the investment.
>
> Such a franchise must contain ample provision for municipal control of service and extensions.
>
> Further, the committee will recommend to Council that a new contract be drawn with all possible dispatch.
>
> This proposal is conditional upon the company resuming operation immediately and of maintaining the same service as existed prior to the recent suspension of operation.

Mr. Blinn Noncommittal

A. C. Blinn, vice-president and general manager, said he could not comment on the proposition until it had been submitted to the company.

Members of Council claimed that the men now on strike will return to work at once if the company accepts this plan. It is said that W. D. Mahon, president of the Amalgamated Association, has instructed them not to demand a wage schedule in excess of that granted recently by the board of arbitration.

The strike of the men on the local line at Massillon, called on July 8, lasted only one day. An understanding was reached between the men and the company. It is said that Council will pass an ordinance increasing the rate of fare from 5 to 8 cents in order to cover the additional wages granted the men by the board of arbitration recently. The company had asked for a rate of 10 cents.

Court Insists on Service-at-Cost Vote

Judge Killits Sends Measure to Toledo Council with a Valuation of $8,000,000—Dangers of Municipal Ownership Pointed Out

Toledo's service-at-cost plan for the settlement of the railway controversy was started through the legislative mill at Toledo last week. This controversy has been holding attention there ever since the famous ouster proceedings of nearly a year ago and was thought to be absolutely deadlocked when the Milner commission and Henry L. Doherty were unable to agree to the valuation figure in the measure after six months of negotiations.

FEDERAL JUDGE JOHN M. KILLITS, who appointed the commissions to draft settlement measures, and to whom the Milner draft was finally given, sent the measure to Council with a valuation of $8,000,000 for the initial capitalization which represents the present properties of the company. This figure is what the commission had agreed to place in the measure. It is $1,000,000 less than the lowest figure offered by Mr. Doherty and possible of fulfillment conditionally.

Court Summons Commissioners

Members of the commission were called in by Judge Killits. They agreed to the plan he presented. The measure was then sent to Council with a lengthy letter, in which the judge explained his position with reference to the measure and also offered some suggestions with reference to the municipal ownership measure now before the people for a vote at the primaries on Aug. 10.

The service-at-cost measure could have been passed by Council and carried on the same ballot with the twin municipal ownership ordinances, but there is a question of constitutionality coming in the variance of the city and state initiative and referendum provisions. When the measure came up in Council on July 9 that body was confronted with an appeal from the service-at-cost commission that action on the ordinance be delayed in order to assure the legality of the measure if finally adopted by the people.

The vote in Council was indicative of the desire of some of the members to bring the plan up regardless of the safeguards for constitutionality. The vote on adjournment without consideration was nine to six, so that it appears the ordinance will easily pass whenever it is brought up again.

Several members of the Council asked for the repeal of the municipal ownership ordinances so that both measures might be submitted at the same time, but the adjournment vote indicated that they were in a minority.

Election May Go Over

It is possible now that the cost-of-service franchise will be submitted at the presidential election in November, provided the vote on public ownership on Aug. 10 does not preclude any further action toward a franchise measure.

In his communication to the Council Judge Killits also took occasion to settle one remaining point of difference between the commissioners and Mr. Doherty. That was over the provision by which bonds providing additional capital for improvements to the system might be sold at a discount if necessary to get the funds.

Judge Killits held that the company contentions on this provision were valid and that so slight a difference in any advantage to the city would be made that it would help to yield this point if it might make the whole measure acceptable to the Doherty interests, if passed by the electorate.

The judge, speaking only as a citizen of Toledo, in his letter to the Council said:

> As a local paper pointed out a few days ago, the charter requires that the car rider, under municipal ownership, must bear all of the cost of service. The same thing is absolutely true under any possible franchise—a street car company can no more be compelled to contract for service under cost than a merchant can be forced to agree to sell his wares at a loss. If the provision for selling bonds at a discount should remain, the car rider would carry the burden of the discount. Six per cent on each dollar for which but 90 cents of improvement was bought would be added to the cost of service. The provision, it seems to me, has possibilities against the city also in that it furnishes a chance to juggle securities. It is plainly to the city's interest that a company which is to serve the community have a chance to transact its business in a business way. The commission was alive to these controlling principles, but offered the provision in question to anticipate a situation when a necessity for expanded service might occur with a bad money market—giving to the city the power to force an immediate enlargement. But such a condition would be a temporary matter only, wherefore it seemed to me that a balancing of considerations advised that the commission recede, if in fact it had not already done so.

Milner Ordinance Safer

In submitting the cost-of-service plan to the Council, Judge Killits undertook to show that the Milner ordinance offers a safer and a much more direct road to municipal ownership than do the twin measures to be submitted next month. Indirectly he expressed the belief that the municipal ownership ordinances are both futile and dangerous. He adds a little argument to show that the contemplated piecemeal condemnation proceedings in the general unwritten plan of the public ownership commissioners will meet with serious objections and a possible interruption of service for several months.

Judge Killits said in part:

> It is a sanguine man indeed who would expect a publicly owned transportation system to be in successful operation within eighteen months after Aug. 10. The acquirement of the company's lines for city ownership by condemnation proceedings means tedious litigation, with some special embarrassment, if it is proposed to take over selected portions of the company's property and cause it to suffer scrapping of the rest. It is not reasonable to expect the company to submit without exhausting all available resources of defence.
>
> If the city should determine to embark upon the experiment of utilizing, through city ownership, acquired by condemnation, some, only, of the company's lines, supplementing this partial supply of the city's needs by some other method of transportation, there is nothing to hold the company to service here until the new arrangement is ready for use. Even if the construction of the Milner law, which the federal court has held is correct, the Utilities Commission could not legally compel street car service until processes were complete to dismember the property and to render much of it mere scrap.
>
> With destruction of its system inevitable anyhow through the city's expressed purpose, it would be the company's privilege to leave us whenever departure seemed to be advantageous to it. Compared with what these delays and conflicts may mean to the city's development, what they may mean to the car rider in higher transportation fares, or deranged systems, the burden of a settlement figure of a million, or even two million dollars higher than we may think the property worth to buy, is insignificant.

In passing the ordinance and asking approval of the electors without the agreement of Henry L. Doherty, the judge declared that the city would then be in the position of offering a fair settlement and the company would not be liable to turn it down for sentimental reasons.

He also argued that the term valuation was used in connection with the service-at-cost plan as a term of agreement on how much would be the initial bond issue on which the return of the company is based.

The campaign for the municipal ownership ordinances is proceeding with open air street meetings addressed by members of the commission and others who favor public ownership.

City Restrained from Buying Buses

Justice Edward J. Gavegan, of the Supreme Court in New York, granted an injunction on July 1 in a taxpayer's action restraining the city from spending $1,000,000 for a municipal bus project, but refused to order that the existing city bus lines be discontinued.

The injunction issued was upon the application of Edward Schafer, made after the Board of Estimate and Apportionment passed a resolution, on March 12 last, authorizing the expenditure of $1,000,000 for the purchase of motor buses to be used upon several new lines which Grover A. Whalen, Commissioner of Plant and Structures, contemplated starting.

Justice Gavegan has had the matter under consideration for a long time. In the meantime the Supreme Court in Brooklyn has granted injunctions against the existing bus lines in so far as they parallel surface lines operated under franchises.

The Corporation Counsel has already taken steps to place the whole matter before the Court of Appeals, which will decide not only cases from Kings County but also from New York County, where the question of city buses competing with two crosstown lines running from Manhattan to Brooklyn already has been passed upon by the Appellate Division.

Justice Gavegan, while enjoining the city authorities from spending any of the $1,000,000 for buying a bus plant and equipment, does not try to stop existing lines of buses running with the

permission of the Commissioner of Plant and Structures.

He also declares that should any new emergency arise by reason of the cessation of any surface lines, his injunction is not to be construed as preventing the Mayor from stepping into the breach to give transportation.

Corporation Counsel Burr will take an appeal from that portion of Justice Gavegan's order restraining the Comptroller from paying out any money to carry out the resolution of the Board of Estimate to have city owned and operated buses.

I. U. T. Safety Banquet

Superintendent of Transportation Turns Cook — Other Officials Entertain with Songs and Hornpipe Dance

The semi-annual safety banquet of the Union Traction Company, Anderson, Ind., for which all members of the various safety committees on the property were invited for one good round of fellowship, took place on June 21.

"JERRY" THE COOK

This affair has come to be an event of some note in the company's annals, and one at which attendance is much coveted. In general, it is a dinner at which there is a little talk about safety and a lot of fellowship, the officials from president down throwing off the cloak of reserve and formality and entering into the event as "one of the boys."

On this recent dinner, "Jerry" Keever, the superintendent of transportation, became cook. In the basement of the Methodist Church he prepared a dinner which, all reports have it, was a wonder. "Jerry" started them with grape fruit, and went the route with fried chicken, ending with strawberry shortcake. After the dinner, Mr. Keever and his division superintendents started off the lighter side of the program with a "sextette." He then announced that the department heads were to sing a song. They favored the men, much to their delight, with the song:

I'm a little prairie flower,
Growing wilder every hour;
No one cares to cultivate me—
I'm as wild as wild can be.

At the end Mr. Brady, the president; Mr. Nichols, the general manager, and all the other department heads danced the hornpipe as they sang. Then everybody joined in and some one shouted "everybody dance." The whole crowd fell into the hornpipe.

A SERIOUS SIDE, TOO

This simply characterizes the good fun and fellowship which is entered into in these safety banquets. Of course the president and general manager had something to say about the serious side of the safety work to begin with, but on the whole, the meeting is probably more important from its value as a "get acquainted" event, wherein workmen down in the ranks find out that the fellows up above are just humans after all.

Hydro-Radial Scheme Halted

Government to Appoint Commission of Full Inquiry Before Allowing Any Further Expenditure

E. C. Drury, Canadian Premier, on July 7 notified Sir Adam Beck, chairman of the Hydro-Electric Commission, in response to a letter from Sir Adam, that the Government, after full and careful consideration, had decided to defer any action in regard to the acquisition of the Niagara, St. Catharines & Toronto Railway, the Toronto Suburban Railway and the Guelph Radial Railway by the Hydro Commission until such time as the Government had satisfied itself by means of a thorough inquiry as to the advisability of going on with the project. Meanwhile the Government requested that, pending the result of such inquiries, further expenditure on the roads should not be made.

THE official statement by Premier Drury was as follows:

When the Government goes ahead, the province will be committed not only to the present proposals but to a province-wide, publicly owned radial electric scheme operated by the Hydro-Electric Power Commission, involving an ultimate mortgage of the province and of the municipalities interested of scores of millions of dollars.

The Government has therefore decided to appoint a commission to go into the whole problem from every point of view and present a report for its information and guidance.

In the meantime all action in the direction of further outlays or the assumption of further responsibilities in radial matters by the Hydro-Electric Commission will be stayed.

SIR ADAM'S RECOMMENDATIONS

Sir Adam had previously stated he hoped to be in a position to announce to the Ontario Government that the Dominion Government had accepted his offer to take over the three electric railways in Ontario owned by the Canadian National Railways. The terms on which Sir Adam Beck recommended the taking over of the railways in question were as follows:

Toronto & Eastern Railway—Price $706,000; payable by Hydro Power Commission 4½ per cent fifty year bonds, guaranteed by the Province of Ontario.

Toronto Suburban Railway—On this railway there are $2,628,000 of outstanding 4½ per cent bonds due 1961. This is to be taken over by the Hydro Power Commission, and the Hydro Power Commission to assume the bonds.

The Niagara, St. Catharines & Toronto Railway—Price for this railway to be $3,544,374. On this road there are $1,098,000 of 5 per cent bonds outstanding.

GOVERNMENT'S MEMORANDUM

The memorandum referred to by the Government in its communication to Sir Adam Beck follows in part:

The obligations of the province of Ontario now outstanding, approximately $65,000,000, or 52 per cent of its present debt, is represented by assistance given to the Hydro-Electric Commission. . . . It will in the near future have to supply between $32,000,000 and $33,000,000 more in cash to complete the Chippawa, Nepigon and other electrical power works in process of construction. In all, there are guarantees to a total of more than $103,000,000 which the province and the municipalities are bound to repay.

Hydro-radial projects, while they may to some degree facilitate the distribution of power as incidental to the operation of the railways, are entirely new and separate from the main object and scheme of the commission.

The debt of the province will within two years amount to $160,000,000 or more. If the radial scheme is gone on with and kept strictly limited (which would be practically impossible) to the lines mentioned, the obligation of the province will approximate $210,000,000. The annual interest charges would be almost equal to the total direct debt of the province in 1908, and the finances of the province would be seriously crippled and great confusion and hardship created for the municipalities if the scheme were not to meet the expectations of its promoters.

The province must not, of course, come into competition with the Canadian National Railway system, as Ontario, by taxation, must provide for from one-third to one-half the C. N. R. annual deficits. Then too, the vast amount that must be annually raised in Ontario to take care of the proportion of Dominion taxation cannot be overlooked.

The province must be assured that the new scheme will be at least self-supporting. It is contended by representatives of certain of the municipalities to be served by the projected roads that the covenant of the municipality relieves the Government of responsibility. If the municipalities were required to furnish the moneys for the construction of the roads this might to a large degree be true, but the fact is that the municipalities look to the province to supply all the money required.

Other points cited as worthy of careful consideration are:

The shortage of Hydro power; that many radials now, with cheaper construction, do not pay; that the experience of U. S. electric railways is financially unsatisfactory, and the municipalities would find it difficult, if not impossible, to float bonds for the projected roads, unless with the guarantee of the Government; that for medium and short distances good roads will serve the public better; that every few years new bond issues would have to be made to pay for additional rolling stock, new sidings, double tracks and many other betterments; that it is fairly open to question whether added responsibility for radials should be placed on the Hydro Commission.

In conclusion the report says:

Some of the foregoing arguments may not be valid and none of them may be conclusive against the ultimate adoption of the proposals. They are, however, as it appears to the Government, conclusive against their adoption at the present time and until the whole subject has been fully and exhaustively examined. The matter is of far too great importance to be dealt with hastily or lightly. A commission will be appointed, and requested to proceed immediately with its task, to hold public inquiries and to report without unnecessary delay.

As matters stand now the Hydro-Radials are tied up until the Royal Commission, to be appointed by the Drury Government, reports on the plans of Sir Adam Beck and the Hydro-Electric Commission.

The announcement of the Government's policy was made just two days before the annual meeting of the Ontario Municipal Hydro-Radial Association, which was held in Toronto on July 9. The meeting was thoroughly representative of all interests embraced in the association. Naturally the policy of the Government as announced came in for strong discussion. Sir Adam Beck was present and outlined the present position of the Hydro-radial and other undertakings.

Electrical Workers Forced to Arbitrate

High-Handed Tactics of Special Force Alienate Sympathy of Other Organized Workers

Electrical workers and other craftsmen in the employ of the Wheeling (W. Va.) Electric Company, the Wheeling Public Service Company and the Wheeling Traction Company returned to work on May 28, after having been on strike since April 30. The men had previously refused to arbitrate. In consequence the companies announced that unless the men did return to work by May 28 their positions would be filled. This resulted in the company being notified that if such a course were followed the other employees would go out on strike in sympathy. The companies felt firmly convinced that the other men were too fair minded to violate their contract by any such procedure, but they laid the facts before the public in a full page advertisement so that the public would be fully informed.

FOR SEVERAL years the companies made concessions to the electrical workers. In the first place it was difficult to secure men to do this class of work and then the total number of employees belonging to these unions was relatively small. This resulted, apparently, in the men arriving at the conclusion that any demands which they might make on the company would be met. A summary of the steps in the controversy follows:

The contracts with the men expired on May 1 each year. They contain a clause which requires either party to have a memorandum of changes in the hands of the other party not later than April 1. In accordance with this clause, the companies submitted to the men on April 1 a contract such as it proposed and the men in turn handed back to the company a contract which they insisted should be accepted prior to May 1. The contract submitted by the men was objectionable in almost every paragraph. About April 10 the companies started a series of conferences with the committee representing the Electrical Workers' union. It soon became evident that the men not only proposed to insist on their demands but also proposed to strike unless their demands were met in their entirety.

The company offered to arbitrate any differences existing on which agreement could not be reached, but the men declined arbitration and on the night of April 30 went on strike on one hour's notice and did everything in their power to force the shutdown of the property. Fortunately, the companies, through the co-operation and support of their loyal employees, were able to operate without serious interruption of any kind.

MEN TOOK ARBITRARY STAND

About May 17 the companies notified their former employees that unless they were back on the job by the morning of May 17 the companies would proceed to fill their places with other men. On about the morning of May 18 the Chamber of Commerce of Wheeling asked the companies to postpone the date on which they proposed to bring in other men until May 26. This the companies agreed to do and later agreed to extend this time to May 28.

When this time came and the electrical workers had made no concessions the companies notified the representatives of the other unions on their property that the companies would expect them to co-operate in securing other employees for the electrical department. In consequence the representatives of these unions forced the electrical workers to go back to work under the terms of the contract which the companies had submitted to them, with the understanding that if there were any sections of the contract which were not acceptable to them the companies would agree to arbitrate any sections of the new contract which differed from the contract under which they worked last year.

It is generally conceded in the Wheeling district that these men took an arbitrary, unreasonable stand from the very beginning and that when the smoke cleared away they had received about as severe a setback as any of the unions in the valley have received in a number of years. The opinion prevails that if the electrical workers had refused to go back to work under these conditions, the other unions would have refused to support them. The companies are hopeful that the entire matter can be settled without the need of arbitration between the contract under which these men went back to work and the contract which existed last year.

The large joint power house of the American Gas & Electric Company and the West Penn Power Company, located at Windsor, W. Va., and all of the Ohio side lines of the American Gas & Electric Company have always been handled as strictly open shop properties. The electrical workers have been trying to force the unionizing of these properties. It was their hope to use the Wheeling Electric Company's plant, which is a subsidiary of the American Gas & Electric Company, and the Wheeling Traction Company, which is a subsidiary of the West Penn Traction Company, to secure this result.

Company Seeks Relief

Denver Tramway Wants Case Decided Which Prevents Company from Reducing Wages

The Denver (Col.) Tramway on July 1 petitioned the Colorado Supreme Court for a writ of prohibition against District Court Judge Greeley W. Whitford, the District Court of the Second Judicial District and the city and county of Denver in the tramway injunction case. Owing to the short time interval which remained before the date set for the adjournment of the Supreme Court for the summer vacation, the case was not heard on its merits but simply on the application to file the petition and for the issuance of a rule upon the city to show cause why further proceedings in the lower court should not be stopped.

Permission was granted by the Supreme Court on July 6 to file the case and the order to show cause was issued. The further condition was attached that the lower court should not proceed further in the case except to enforce, if necessary, the provisions of the present temporary injunction against the company, and also to take up the matter of the issuance of a temporary writ against the local division of the Amalgamated Association. Dates were set for the filing of briefs by the parties at interest and oral arguments will be heard on Sept. 13.

The injunctive proceeding was instituted by the Mayor of Denver following the refusal of the City Council to pass a 7-cent fare ordinance and the announcement by the company of a reduction in wage scales which was to have become effective on June 1. The employees had announced their intention of striking as soon as the wage reductions became effective. Upon the application of the city and county of Denver, District Judge Whitford on May 29 issued a restraining order against the tramway and the local division of the Amalgamated Association. Under its provisions the company was estopped from taking any action which would interfere with continued railway service.

This literally compelled the company to continue in force the higher wage scales granted its employees by a local board of arbitration on March 18, 1920, even though its revenues are insufficient by about $1,200 a day to meet the same. Judge Whitford on June 26, after a hearing, granted a temporary injunction against the company.

That part of the restraining order directed against the Amalgamated Association which prohibits it from calling a strike is still in effect, as the representatives of the association through continuances delayed the pleading date until after the company's part of the injunctive proceeding had been disposed of. The city's position is that the restraining order against the men has the same effect as a temporary injunction and is for an indefinite period, or at least until the District Court acts either to dissolve the same or change it into a temporary injunction. Counsel for the union on July 7 filed a demurrer to the city's complaint and a motion to dismiss the proceeding on the grounds of lack of jurisdiction, but apparently it will be necessary for them to endeavor to substantiate their claims by a direct appeal.

Without awaiting final decision by the courts regarding the present points involved the representatives of the men's union are endeavoring to confuse the issue still more by demands made on the company on July 2. They are seeking to establish a wage scale for trainmen of 70 cents the first three months, 73 cents the next nine months and 75 cents thereafter, with corresponding increases for the employees in the other departments. Demands are also made that negotiations be started looking toward a new working agreement to replace the one which expired by limitation on May 31, 1920. This the company elected not to renew. The union representatives insist that final action on these demands be taken by the company not later than Aug. 1. A copy of the demands was also filed with the Colorado Industrial Commission in compliance with the law creating that body which requires that thirty days' notice be given of any contemplated action by employers or employees which might result in stoppage of work. Jurisdiction over the case has not been taken as yet by the Industrial Commission.

$332,500 for One-Man Cars

Norfolk Company, Planning Rehabilitation of System, Secures Approval of One-Man Cars

The City Council of Norfolk, Va., on July 8 granted permission to the Virginia Railway & Power Company to operate fifty one-man cars in the city of Norfolk, and an ordinance was enacted making this possible.

This decision on the part of the Council was reached after a lengthy public hearing. This permission was granted the company on the urgent recommendation of A. Merritt Taylor, traction expert employed by the city several months ago to make a survey of Norfolk's public utilities and determine what must be done to get better service. Mr. Taylor's recommendation for the "one-man" cars had previously been presented to the Council in executive session and decision was withheld until the public could be heard.

It was necessary to make a quick decision, Mr. Taylor pointed out, because an option on sufficient money to finance the proposition would expire July 9 at noon. The fifty cars, as approved, will cost $332,500, and as a result of the Council's approval of the project, the money can now be secured.

The Virginia Railway & Power Company admitted it must have at least thirty double-truck cars or thirty-eight single-truck cars, to operate its normal schedule this coming winter with closed cars exclusively. The company secured bids for the construction and delivery of twenty double-truck closed cars and ten closed trailers, to cost $420,000. It also secured bids for the construction and delivery of fifty safety cars to cost $332,500.

The thirty double-truck cars, Mr. Taylor pointed out, could not be delivered until from five to six months after signing a contract and furnishing complete information and details of design and construction. The fifty safety cars, however, can be delivered during the month of August, if the order be placed promptly.

The company arranged to finance, by car trust certificates, the purchase of either twenty double-truck closed cars and ten double-truck closed trailers or fifty safety cars and requested the Public Utilities Commission and City Council to determine whether the city desired thirty double-truck cars or fifty single-truck cars. The company took the position that it would proceed at once to provide whichever type of car the municipality selected. It found itself unable, however, to finance the purchase of more than thirty double-truck cars. Mr. Taylor's recommendation follows:

As the city's representative, I have carefully considered all relevant factors involved and emphatically recommend that the company's proposition to provide fifty safety cars be promptly accepted for the following reasons:

1. Cost of operation of fifty safety cars will be much less than operation of forty double-truck cars, which would be their practical equivalent. Thus the burden of car riders of Norfolk would be lightened to the extent of at least between one-half cent and 1 cent a passenger.

2. Operation of safety cars will furnish more frequent and efficient transportation at less cost than the operation of double-truck cars; frequency of service will be increased by safety cars at least 25 per cent and schedule running time will be materially decreased owing to quick stopping and quick starting of safety cars, which is impracticable with the heavy double-truck car.

3. Operation of safety cars with at least 25 per cent greater frequency than double-truck cars in giving the public better service will increase the riding habit and gross earnings of the company, in addition to decreasing the cost of furnishing transportation, and thereby tend to keep the rate of fare down to a minimum by providing more and better service which will induce more rides per capita.

4. I shall recommend as a part of the re-routing plan now being develeped that Lamberts Point line be re-routed from Lamberts Point via Thirty-eighth Street, Killam Avenue, Thirty-fifth Street, De Bree Avenue, Broadway, new tracks on Granby Street, Eighteenth Street, Church Street to Plume Street, Atlantic Street City Hall Avenue, Granby Street, Main Street, to Church Street, returning via the same route, instead of as at present through Ghent and the business district of Granby Street.

My opinion is, the city authorities should emphatically decline to burden the people of Norfolk with the proposed thirty double-truck cars which will tend to increase car fares from one-half to 1 cent per passenger; they would restrict the frequency of service and thereby retard the necessary increase in the riding habit which will be generated by more frequent service which the one-man car will give.

The success of the co-operative undertaking between the city and the company will depend largely upon the action taken today with respect to this subject by the municipal authorities. If the safety cars be approved, promptly ordered and placed in operation, the results will enable the working out of your transit problems in a way which will promptly bring to Norfolk first-class street railway facilities and give the Public Utilities Commission, City Council and citizens all they have hoped for in the way of transportation facilities, at a fair price.

There yet remains much to be done. If this important step is taken in the right direction, the way is clear and the success is assured.

My recommendations which are now being formulated will involve the expenditure of a vast amount of money by the company in building new tracks through district now lacking service, in rebuilding such of its present tracks as are worn out, in making new track connections required for necessary re-routing and in improving its facilities in general.

It is essential to aid the company in providing most efficient service at minimum cost in order to keep the rate of fare down and to build the company's credit up, so that it can meet the city's requirements at minimum cost to the car riders.

The *Ledger-Dispatch* said editorially:

Council is to be thanked and congratulated for having taken a courageous step in opposition to what seemed to be a large volume of popular clamor; the company is to be congratulated for being able to deal with a small body of courageous and quickly decisive men, instead of with an unwieldly bicameral body which generally kept its ear to the ground and frequently heard a false tone, and the city is to be congratulated because its representatives and the representatives of the company now place all their cards face up on the table.

Municipal Road Seeks Talent

The Board of Street Railway Commissioners of the city of Detroit, empowered by a vote of the people to construct a municipally-owned and operated street railway, is interested in receiving applications for the major executive positions, especially the position of general manager. Communications include a brief but complete history of the writer's experience. Ross Schram, secretary of the Board of Street Railway Commisioners, Detroit, Mich., may be addressed.

Detroit Awarding Contracts

City Going Steadily Ahead with Its Plans for System to Compete with D. U. R.

With contracts awarded for foundations, ties and steel for about 30 miles of municipal railway, Detroit has about one-third of the Class A lines (the first lines to be built under the Couzens plan) now under way.

Shortly after the awarding of the contracts, Judge Arthur J. Tuttle of the U. S. District Court dismissed the suits which were filed by the Detroit United Railway and the New York Trust Company, last May, in which it was sought to enjoin the enforcement of the Municipal Street Railway ordinance.

The suits were based on the alleged claim that the city's program included the contemplated purchase of certain of the Detroit United Railway lines at less than their actual value and therefore were confiscatory. The dismissal of these suits removed the last legal question concerning the proposed municipal lines.

Judge Tuttle held that while the ordinance adopted by referendum on April 5 did not provide the city with the power to purchase any of the Detroit United Railway lines, the ordinance was valid and operative for the construction of a municipal street railway system.

May Average Down on Prices

According to present estimates by the street railway commission, the cost of the newly contracted portions of street car lines will exceed the Mayor's original estimate of $70,000 per mile by $5,000 to $10,000 per mile. This present cost of $75,000 to $80,000 per mile is based upon contract prices for excavating, concrete foundation, ties, steel, and paving between rails.

It is believed that the highest point in construction charges has been reached and that the remaining portions of the 101 miles of lines can be laid under more favorable conditions and at prices which will bring the general average for the whole system down to the original $70,000 per mile estimate.

Detailed estimates of the cost of paving between tracks are being worked out by the commission's engineer, and will embody analysis of costs of various grades of paving material that may be used. The kind of paving between tracks will depend somewhat upon the kind of pavement in the streets lining the tracks.

The steel rails for the road were contracted for at $71.90 per ton, or approximately $25 per ton below the next highest competitive bidder and at a price which is considered much less than the prevailing market. Contract was awarded to the Lorain Steel Company, and the low bid is attributed to the policy of the company to stabilize prices at a lower level than can generally be obtained at the present time. No delay is anticipated in getting the steel delivered by the mills as rapidly as it is needed.

Omaha Case Closed

Men Withdraw from Investigation—Acrimonious Passages at Arms Mark Hearings

The hearing of a wage controversy between the Omaha & Council Bluffs Street Railway and its men, before the Nebraska State Railway Commission, was concluded when counsel for the men withdrew, after presenting the following statement:

> Early in the hearing the men learned that the commission was not concerned with what was a just and proper measure of the value of their services, but only with the price for which that service could be bought in the open market. They were told that a jurisdiction grounded on the interest of the public in a public utility was purely the mercenary interest of how much labor could be bought for the least money and that the wages necessary to meet living conditions would not be inquired into. Refusing to accept the principle underlying the decision of the commission, that labor is a commodity, the union withdraws from the hearing and their counsel will not participate further in direct or cross-examination in the so-called inquiry.

Members of the state commission came from Lincoln to Omaha a month ago in response to an application of the union and at a time when the men made a demand of 13 cents an hour increase, holding a strike vote in suspension. The hearings have been marked by bitter controversies. Excerpts are illustrative. Counsel for the men said:

> Why discriminate against testimony to show undue power exerted by an outside organization in Omaha, when this commission permitted cross-examination of union men on the power wielded by the Amalgamated Association outside of Omaha?

To this Commissioner Thorne Brown replied:

> Only because the testimony on the strike vote by the union was pertinent to the question of impairment of service, whereas the courts have established the right of an employer to employ or to refuse to employ whomsoever he pleases, irrespective of the source of that policy.

R. A. Leussler, vice-president and general manager of the company, asserted in testimony that he was opposed to the closed-shop policy because it was un-American. When asked by counsel for men what standard he used to judge Americanism, Mr. Leussler replied, "The constitution of the United States."

"These investigations are necessitated by the autocratic tyrannies of unions led by counsel," retorted Alvin Johnson, counsel for company, addressing A. H. Bigelow, counsel for the carmen.

Mr. Leussler testified that the average pay received by trainmen of his company during the last nine months was $155 per month; that during May of this year the average of all of the men was $125, and that the May average of those who worked twenty-five days or more was $152. He also stated that he had compiled a list of 325 cities and that only twenty-nine showed a higher scale of pay than Omaha. The present Omaha scale is 53, 55 and 57 cents an hour. This official of the company also testified that he has repeatedly told the men that the company's present problem is to maintain the existing schedule of pay. He also advised the commission that during a recent period of two weeks the company received 107 applications from men anxious to become conductors and motormen at the present rate of pay.

The commission has taken the matter under advisement.

Chicago Shopmen Strike

Insist on Closed Shop—Company's Wage Offer Satisfactory to Majority —Intimidation Used

A strike of shopmen at the south shops and of linemen and substation operators called very suddenly early on July 15 brought about almost a complete tiup of the Chicago Surface Lines. About 300 men were involved. The thirty-two substations were of course the key to the situation. At four o'clock a great many of the night cars were left stranded on the system without power. Later sufficient substation capacity was put in operation by officials to return these cars to the carhouses.

By noon with the help of the Commonwealth Edison Company and what company stations could be manned, about 300 cars out of the normal midday schedule of 1,400 cars were running. This made it possible to give full service on some lines. An effort was being made at 10 a.m., July 15, to place the remaining substations in operation.

So far the trainmen and the west shop employees and all other employees have remained loyal. They all reported for duty as usual, the trainmen taking cars out as fast as power was made available.

The wage offer made by the company is considered generous in comparison with wages being paid by other companies. In fact, the company's offer was acceptable to a majority of the men, who are said to have been intimidated into striking.

The real issue of the strike is the refusal of the company to grant a closed shop at the south car shops. The trouble has been further stirred up by "Umbrella" Mike Boyle, business agent of the electrical workers' union, who was convicted of conspiracy by a Federal Court a few years ago and recently pardoned by President Wilson.

Wage offers made by the company average a 25 per cent increase with no change in working conditions. The union leaders have stated they would not consider anything until the closed shop was conceded. The strike has not affected the elevated system. A large amount of the morning rush traffic on July 15 was thrown on the elevated and the suburban steam trains.

Mr. Ford's New Car on His Own Road

Purchase of the Detroit, Toledo & Ironton Railroad by Henry Ford and his son, Edsel B. Ford, was announced on July 10 by E. G. Leibold, secretary to Henry Ford. The purchase price was not disclosed. In providing passenger service it is intended, according to the announcement, to utilize the new gasoline driven car of the interurban type which Ford engineers have developed.

News Notes

Vetoes Philadelphia Buses.—Mayor J. Hampton Moore of Philadelphia, Pa., has vetoed an ordinance recently passed by the City Council granting a franchise to the Philadelphia Transportation Company to operate a line of motor buses in Broad Street, Philadelphia. The company proposed to place between twenty and thirty buses in operation by Sept. 1 and to operate at a 5-cent fare, in competition with the Philadelphia Rapid Transit Company. It is pointed out that a subway under Broad Street is at present an important unit in the city's own program for transit development, and that a bus line on the same thoroughfare would be in direct competition with the city's own utility as developed by the present rapid transit plans.

Would Operate Frankford "L."—Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, has notified Mayor Moore of that city that he will recommend to the company's board of directors that a lease be made with the city whereby the company will operate the Frankford elevated line now in course of construction, paying a rental equivalent to 5 per cent of the city's investment. Mr. Mitten points out that the Frankford line operated independently cannot be made to pay operating costs, without considering earning interest on the investment. He holds that the P. R. T. can operate the line as a part of its general system with greater economy, but that even then it cannot be made to earn operating expenses and carrying charges at the rate of 5 per cent per annum.

Check Assumes Five-Cent Fare as Inadequate.—A check reproduced in the Interborough *Bulletin* shows a gift received by the Interborough Rapid Transit Company, New York. It was for the amount of $2.50 and was signed by F. B. Maloy of 714 Grandview Avenue, Pittsburgh, Pa. Mr. Maloy had been on a visit to New York and had ridden over the different transportation systems of the city the usual number of times. He does not consider a 5-cent fare as sufficient and in order to back up this statement he inclosed the check. Mr. Maloy assumed that while he rode in New York the company lost on each ride. The $2.50 was forwarded with the statement to the effect that, "if it does not cover all the deficit, in any case it is at least an evidence of good will." Frank Hedley, president and general manager of the Interborough, in his reply was much gratified with the spirit with which the gift was sent. The money has been placed in the welfare fund.

Financial and Corporate

Lake Erie Sale Decree

Court Lays Down Conditions Under Which Buffalo Interurban Property Will Be Disposed Of

Bids for the purchase of the property of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., between Buffalo and the Pennsylvania state line, with the exception of the Dunkirk-Fredonia division, will be received by the receiver, George S. Bullock, until Sept. 15. On that day the interurban line will be discontinued as the result of an order granted by Justice Wheeler in the Supreme Court at Buffalo. As a pledge of good faith bidders must deposit part of the purchase price in advance of the sale.

The application of the receiver to dismantle the road will be held in abeyance by the court until after the court is advised of the bids received for the property. Bidders can bid on the property as junk or can bid on it as a going proposition.

Justice Wheeler cites a number of decisions holding that a public service corporation cannot be compelled to continue service indefinitely at a loss. The company at hearings before the court contended that to continue any longer would result in exhaustion of the road's assets.

The line between Dunkirk and Fredonia is not included in the order. The court rules this can be successfully operated by the company. This is the old Dunkirk & Fredonia Railroad taken over by the Buffalo & Lake Erie Traction Company soon after the latter was organized. If that road also is to be abandoned the court ruled that it would have to be a separate application, and the intimation was drawn that such an application would be denied.

The Buffalo & Lake Erie Traction Company operates through express, freight and passenger cars between Buffalo and Erie, Pa., a distance of almost 100 miles. Part of the line is double tracked. Local service also is given in the city of Dunkirk. The road connects at Westfield with the James town traction line running south into the Chautauqua County fruit country. The discontinuance of service affects workers of the Lackawanna Steel Company living in Buffalo. The Buffalo & Lake Erie Traction Company operates the Buffalo & Lackawanna Traction Company and serves commuters between summer resorts on the south shore of Lake Erie and Buffalo.

Interborough Rapid Transit Shows Improvement

After deducting interest, rentals, etc., the Interborough Rapid Transit Company shows a net income of $26,152 for the month of May, 1920. This is contrasted with a deficit of $153,793 in May, 1919. For eleven months ended May 31 there was a deficit of only $1,953,664. This was a decrease of 45.8 per cent over the same period ended May 31, 1919. For the month of May, 1920, the passengers carried increased more than 10,000,000. This was an increase of 14 per cent over those carried in May, 1919. Over the longer period of eleven months, the number of revenue passengers increased from 739,000,000 to 875,000,000, or 18.4 per cent.

SUMMARY OF EARNINGS OF INTERBOROUGH RAPID TRANSIT COMPANY.

Month ended May 31, 1920	1920	1919	Percentage Change over 1919
Total operating revenue	$4,597,479	$4,019,001	+ 14.4
Total operating expenses	2,721,661	2,353,366	+ 15.7
Net operating revenue	$1,875,818	$1,665,635	+ 12.6
Total taxes	221,575	238,576	— 7.14
Operating income	$1,654,243	$1,427,059	+ 15.9
Non-operating income	57,752	50,875	+ 13.5
Gross income	$1,711,995	$1,477,934	+ 15.8
Interest, rentals, etc., including Manhattan guarantee	1,685,843	1,631,677	+ 3.3
Net income	$26,152	$*153,743	—117.0
Operating ratio (per cent)	59.20	58.55	+ 1.1
Revenue passengers carried	85,941,348	75,455,737	+ 13.9

Eleven months ended May 31, 1920	1920	1919	Percentage Change over 1919
Total operating revenue	$47,186,555	$39,294,196	+20.1
Total operating expenses	28,963,080	23,904,732	+21.2
Net operating revenue	$18,223,475	$15,389,464	+18.4
Total taxes	2,402,385	2,919,142	—17.7
Operating income	$15,821,090	$12,470,322	+26.9
Non-operating income	535,813	542,331	— 1.2
Gross income	$16,356,903	$13,012,653	+25.7
Interest, rentals, etc., including Manhattan guarantee	18,310,567	16,624,228	+10.1
Net income	$*1,953,664	$*3,611,575	—45.8
Operating ratio (per cent)	61.38	60.83	+ 0.9
Revenue passengers carried	875,108,977	738,912,604	+18.4

* Deficit.

New Financial Plan

American Railways Outlines Scheme for Taking Care of Obligations Now in Default

A grave situation confronts the American Railways, Philadelphia. Van Horn Ely, president of the company, ascribes this largely to the result of conditions imposed by the late war, which necessitated large expenditures of capital to meet the demands for power and transportation in the district served, large increases in the cost of maintenance and betterments, and made it impossible satisfactorily to market the securities of the subsidiaries owing to the changed money conditions, especially as to interest rates.

Mr. Ely says that in his opinion it is imperative that the company be provided with $4,400,000 in order to protect the holders of the common stock. The company has a funded debt aggregating $12,700,000, all of which is secured by pledge of various collaterals. The company has ample earnings to provide for the interest charges and no immediate steps are required with respect to such indebtedness for the protection of the common stock. The company owes about $3,500,000 upon its own notes and upon the notes of subsidiary companies indorsed by it. The company and its subsidiaries also owe approximately $900,000 for supplies.

Outline of Plan

The company has worked out a plan whereby it is believed that the indebtedness now represented by notes of approximately $3,500,000 can be funded into a five-year secured 8 per cent loan. Many of the holders of the present notes of the company have agreed to accept the new notes, but the extension is based upon the placing in the company's treasury of about $900,000 to take care of the other floating debt.

This $900,000 the company proposes to take care of by the issue and sale of second preferred 7 per cent stock. The company turns to the holders of the common stock as the purchasers of this second preferred stock. This is the same as turning to the holders of the 4-6 per cent bonds of the National Properties Company. Under the arrangement proposed the present 4-6 per cent bondholders by putting up $17.50 with respect to each $100 of bonds, would take all of the rights which will arise from the foreclosure of the 4-6 per cent bonds pledged, to the entire exclusion of the underwriting syndicate.

Mr. Ely explains that the bondholder will conserve his own interest by this payment of $17.50 and will receive 80 to 90 per cent of the amount paid in second preferred 7 per cent stock of the American Railways, and will also receive more than the face of his bonds in American Railways common stock.

The committee representing the 4-6 per cent bonds of 1916 has submitted a plan based upon an offer from an underwriting syndicate. This offer must be accepted by the committee and the holders of a majority must deposit their bonds on or before July 26.

Operating Ratio Increasing

Reports of Roads in Rhode Island Show Expenses Outstrip Gains in Earnings

According to the seventh annual report of the Public Utilities Commission of the State of Rhode Island for the year ended Dec. 31, 1918, there were ten companies reporting and three operating. This neglects the Bay State Street Railway, which at that time operated a small percentage of its lines in Rhode Island.

SUMMARY OF RHODE ISLAND OPERATIONS

	1918	1917	Percentage Change Over 1917
Number of companies reporting	10	11	— 9.1
Number of companies operating	3	4	—25.0
Assets:			
Investment in road and equipment	$49,066,860	$48,502,335	+ 1.15
Other investments	3,169,703	3,100,670	+ 2.22
Current assets	1,223,846	1,691,620	—27.70
Unadjusted assets	224,202	236,841	— 5.32
Total assets	$53,684,611	$53,531,466	+ 0.28
Liabilities:			
Capital stocks	$28,835,596	$28,694,596	+ 0.49
Long term debt	15,884,700	15,884,700	.....
Current liabilities	4,700,716	3,888,575	+20.91
Deferred liabilities	45,579	103,029	—55.75
Unadjusted credits	866,042	785,217	+10.30
Corporate surplus	3,351,978	4,175,349	—19.71
Total liabilities	$53,684,611	$53,531,466	+ 0.28
Operating revenues:			
Revenue from transportation	$7,431,868	$7,058,470	+ 5.28
Other railway operations	154,088	161,440	— 4.57
Total operating revenue	$7,585,956	$7,219,910	+ 5.07
Total operating expenses	5,849,527	4,742,887	+23.35
Net revenue railway operations	$1,736,429	$2,477,023	—29.93
Net revenue auxiliary operations	15,886	6,835	+132.30
Net operating revenue	$1,752,315	$2,483,858	—29.40
Taxes assignable to railway operations	684,245	535,257	+27.85
Operating income	$1,068,070	$1,948,601	—45.30
Non-operating income	1,087,563	1,083,582	+ 0.37
Gross income	$2,155,633	$3,032,183	—28.90
Deductions from gross income	1,954,486	1,930,592	+ 1.24
Net income transferred to profit and loss	$201,147	$1,101,591	—81.80

Operating Revenue Increasing

The net income for 1918 transferred to profit and loss decreased over that of 1917 by about $900,000 or approximately 82 per cent. This large decrease in net income was due to the increase of 23 per cent in operating expenses. The operating revenue increased only 5 per cent. The operating expenses increased more than $1,000,000 but the operating revenue increased only $360,000. Taxes were $150,000, or 28 per cent more than the preceding year. Items going to make up the income practically stood still.

Of the total operating revenue the revenue from transportation increased slightly to a total of $7,432,000, whereas the revenue from other operations such as freight decreased.

The report shows that the total number of revenue passengers carried during the year was 144,336,765, of whom only 15,636,219 were free transfer passengers. This was an increase of 1.8 per cent in the total passengers and a decrease of nearly 10 per cent in the free passengers. The average fare paid by each revenue passenger was 6.22 cents, or a decrease of 4.16 per cent, while the average fare for all passengers was 5.90 cents or a decrease of 6 per cent.

It cost the companies 26.6 cents to run a car a mile. This was an increase of 22 per cent over 1917. The cost per car hour was $2.07. This was an increase of only 2.5 per cent. The company's receipts were 34.6 cents per mile. This was an increase of 4 per cent. The operating cost per car hour was $2.69 or a decrease over 1917 of 13.5 per cent.

The operating ratio increased by 17.5 per cent. The miles of road owned and operated decreased very slightly as did the total track owned and operated. There were forty more new passenger cars purchased than in 1917 and seven new freight or express cars. This makes a total increase in all types of rolling stock of 3 per cent.

STATISTICAL INFORMATION—RHODE ISLAND

	1918	1917	Percentage Change Over 1917
Total car mileage	21,937,067	21,668,037	+ 1.24
Total car-hours	2,820,345	2,318,385	+21.63
Ratio C.M. to C.H. (speed m.p.h.)	7.78	9.37	—16.96
Passenger traffic:			
Regular fare passengers	128,700,546	124,463,949	+ 3 4
Free transfer and other free passengers	15,636,219	17,332,532	— 9 8
Total passengers carried	144,336,765	141,796,481	+ 1.8
Passenger revenue	$6,959,992	$6,632,900	+ 4.9
Average fare per revenue passengers (cents)	6.22	6.49	— 4.16
Average fare per all passengers (cents)	5.90	6.28	— 6.04
Operating ratio (per cent)	77.2	65.7	+17.5
Car-mile statistics:			
Revenue from transportation (cents)	33.9	32.5	+ 4.3
Operating revenue (cents)	34.6	33.3	+ 3.9
Operating expenses (cents)	26.6	21.8	+22.0
Net income (cents)	0.9	5.1	—82.3
Passenger traffic (total)	6.58	6.54	+ 0.6
Car-miles per revenue passenger	0.170	0.174	— 2.3
Car-hour statistics:			
Revenue from transportation	$2.64	$3.05	—13.4
Operating revenue	$2.69	$3.11	—13.5
Operating expenses	$2.07	$2.02	+ 2.5
Net income	$0.07	$0.47	—85.1
Passenger traffic (total)	51.2	61.2	—16.3
Taxes—per cent of gross revenue	9.0	7.4	+21.6
Percent of net operating revenue	39.0	21.5	+81.4
Gross income earned on stock outstanding	.19	.27	—29.6
Mileage statistics:			
Miles of road owned	184.98	186.12	— 0.61
Miles of road operated	546.47	556.24	— 1.76
Total all tracks owned	196.85	197.97	— 0.57
Total all tracks operated	658.27	668.01	— 1.45
Total single track (owned or operated)	332.32	340.96	— 2.53
Rolling stock owned:			
Passenger cars	1,237	1,197	+ 3.32
Freight and express cars	114	107	+ 6.54
All other cars	222	223	— 0.45
Electric locomotives	4	4	.....
Steam locomotives	4	4	.....
Total equipment—all classes	1,581	1,535	+ 3.0

Gross Increased 16 per Cent

Illinois Traction Company Has Increased Earnings from All Types of Public Utilities

According to the sixteenth annual report of the Illinois Traction Company, Peoria, Ill., the gross earnings from railways were $9,927,872. This was composed of the earnings of the interurban lines of $5,930,523, and the city lines of $3,997,349. The earnings from the interurban lines increased over 1918 by $1,190,444, or 25.1 per cent. Compared with 1918, the earnings on the city lines increased $646,032, or 19.3 per cent. The total gross earnings of the company, which, in addition to the railways, includes gas, electric, heat and water companies, was $17,756,584. Total expenses, including taxes, amounted to $12,544,181, thereby allowing a net income from operation of $5,212,403. The surplus for 1919, after deducting for interest on bonds, depreciation, etc., was $1,335,394.

Package Express Service Inaugurated

The traffic department of the interurban lines was entirely reorganized the first of the year, and its headquarters moved from Springfield to Peoria. On June 1, 1919, an express service was inaugurated on the interurban lines and the revenue from this source will offset the loss sustained when the American Railway Express withdrew its service.

The Illinois Traction Company controls fifty-five companies, of which number thirty-two are railways.

Driving It Home

Newspapers Told That Public Utilities, Like Themselves, Must Have a Living Wage

Electric railway managers are often put to it to find a means of presenting their needs to the public through the newspapers. The raising of the price of many periodicals, however, offers an opportunity of getting "under the skin" of newspaper editors. At least one utility body is taking advantage of this increasing cost of subscribing to periodicals to point out the fact that public service companies have been forced to raise their charges to stay in business.

The Illinois Committee on Public Utility Information, Chicago, is driving home to newspaper editors the needs of Illinois utilities. To a notice of an increase in the price of a periodical to which it subscribes, the committee replies by drawing a parallel between its own case and that of the newspaper. In effect it says to the editor: "You have had to raise the price of your paper. You were entirely justified in so doing. You should therefore be tolerant toward us. We, like yourselves, must have a living wage."

The letter used by the committee for this purpose runs as follows:

Enclosed find check covering renewal of our subscription for the coming year.

While we note by the bill of practically all Illinois newspapers to which we subscribe that the price has been largely increased, we appreciate that newspapers have been confronted by the same after-the-war dilemma as the public service companies: that of having a fixed price for their commodity and no strangle-hold on rising costs of production. We appreciate that if a newspaper proprietor continues to stay in business—to buy paper, ink, machinery, pay current labor costs and serve his community and patrons as capably as in the days when production costs were not so bigh—he must have revenues commensurate to meet the increased prices, just as we have been insisting in behalf of the utilities over the last year. And we believe his customers should be fair with him about it.

Were a newspaper "starved" we would not renew our subscription to it, for the inefficient service it would render in the way of presenting the news of the community would be dear at any price. Our belief is that a well-supported newspaper can do a much more constructive and useful work in the community than a poorly supported one.

We have been gratified to find the press of the State, with but few exceptions, appreciates the problems of the utility industry in these difficult times and is fairly presenting to the public what under-development, resulting from "starvation" of electric light and power, gas, electric railway and telephone service would mean to the growth and prosperity of the State and to all business. Liberal use has been made of material contained in the weekly news bulletin issued by the committee, but this is not extraordinary as Illinois newspapers can usually be counted upon to aid in promoting any movement which is for the public good and intended to stimulate development of the State. The news service will be continued and we hope you will find increased use for it.

Municipal Road Reports a Profit

The passenger receipts of the Pekin (Ill.) Municipal Railway for June were $3,233, the largest yet recorded. An additional $11 was received from advertising, making a grand total of $3,244. The total disbursements were $2,054, leaving excess earnings of $1,190. A 5-cent fare is charged.

Financial News Notes

Small Georgia Road to Suspend.—The Albany (Ga.) Transit Company has announced its determination to abandon service and scrap the equipment.

Wants to Issue $313,000 Bonds.—The Little Rock Railway & Electric Company, Little Rock, Ark., has applied to the Arkansas Corporation Commission for permission to issue $313,000 of bonds, of which $263,000 is for improvements to the present water plant and $50,000 for purchase of transformers, meters and other electrical equipment.

Service Resumption Planned.—The Council of Lockport, N. Y., has adopted a report of the streets committee approving a ten-year franchise to the International Railway, Buffalo, N. Y., for the resumption of local and interurban service on the Grand and Gooding Streets lines. Service on these lines was abandoned a year ago. The franchise was granted upon the condition that the company make certain track improvements suggested by the city.

Employees Paid for Selling Stock.—In connection with the campaign for the wider distribution of its stock locally, the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, is offering a special inducement in the shape of a substantial commission to such of its employees as sell the company's preferred stock to their friends and neighbors. One month recently one of the employees received $200 as compensation for his work in selling stock. Another man received $100.

Protective Committee Formed.—A protective committee has been formed to represent the holders of the $5,000,000 of Lexington Avenue & Pavonia Ferry Railway first mortgage 5 per cent bonds of 1993. The members of the committee are: F. J. Fuller, vice-president of the Central Union Trust Company, New York; A. R. Horr, vice-president of the Equitable Life Assurance Society, and Reginald Foster, general counsel of the New England Mutual Life Insurance Company. Charles E. Sigler, 80 Broadway, New York, is secretary of the committee; the Central Union Trust Company is depository and Alexander & Green are counsel. The road is included in the system of the New York (N. Y.) Railways.

More Than One Ride per Capita per Day.—The May financial statement of the Des Moines (Ia.) City Railway shows an improvement over the month of April. Net profits for the month of May were $7,577, as against $362 for April. The number of passengers in May totaled 3,863,443, compared with 3,689,006 for the previous month. Rush-hour traffic is falling off in Des Moines if the May figures are a criterion. A drop of from 74 to 69 passengers per car is reported. Sunday and park riding is showing a considerable gain. During May there were more passengers per day than Des Moines has population, as the new census figures give Des Moines a population of 126,468 and 127,852 daily rides were registered by the city railway.

Notes Extended at 7 Per Cent.—Holders of more than 98 per cent of the 6 per cent two-year gold notes of the Birmingham Railway, Light & Power Company, Birmingham, Ala., due on April 1, 1919, have deposited the notes under an agreement dated Feb. 15, 1919, and the committee has approved the extension of the notes at 7 per cent to April 1, 1921. The committee has made arrangements for the payment of overdue interest on the notes deposited with it together with interest on such deferred payments up to May 10, and holders of the undeposited notes who now decide to send their notes in for deposit with the committee will receive their back interest on the same basis. The time for deposit has been extended to Oct. 1 for the benefit of those who have not yet come in under the plan.

Seven per Cent Notes of Michigan Company Offered.—Edgar, Ricker & Company and Marshall & Ilsley Bank, Milwaukee, Wis., are offering at a price to net 8 per cent, according to maturity, $200,000 of secured convertible serial 7 per cent notes of the Escanaba Power & Traction Company, Escanaba, Mich. They are dated May 1, 1920, and are due $50,000 each May 1, 1922, to 1925. The notes are secured by deposit of $400,000 of general and refunding mortgage 5 per cent bonds. The company is the successor to the Escanaba Traction Company organized in 1909 as a consolidation of the Escanaba Power Company and the Escanaba Electric Street Railway. The present appraised valuation is $1,910,500. The company has $729,000 of bonds and $200,000 of notes outstanding.

Sees No Hope of Service Resumption.—In a letter to the Public Service Commission John G. Morgan, general manager of the New York & North Shore Traction Company, Roslyn, N. Y., states in part: "We have endeavored to interest outside capital, but with no success. It is our conviction that there is no money to be had for electric railway enterprises in this city. There appears to be no further steps the officials of the company can take toward obtaining a resumption of operation. It would, therefore, seem that if the road is to resume operation, it can only come about by persons interested in the development of the community served putting on foot a plan to secure this service. Any such movement will have our fullest co-operation, and we have no doubt that the property can be acquired at a very small figure."

Traffic and Transportation

Referendum on Fares

Seattle Municipal Railway Advance May Be Held Up—Suspension of Service Likely

If the fare increase on the lines of the Seattle (Wash.) Municipal Railway, set to become effective on July 19, is delayed by the circulation of the referendum petition calling upon the Council to submit the fare problem to the voters, the railway may be tied up and 2,300 employees may be unable to cash their pay warrants after July 25.

Ed Terry, City Treasurer, has stated that if the new 6¼-cent and 10-cent fare schedule is not put into effect on July 19 he will place the railway on a warrant basis on July 25, the bimonthly payday of city employees, and that warrants issued to the railway employees on that date will be stamped "not paid for want of funds." It would then be necessary for the employees to cash their warrants at local banks.

Representatives of the Seattle Clearing House Association have informed Mr. Terry that they will not honor railway warrants unless they can be assured the paper will not accumulate without being redeemed at some fixed date. As the matter stands now, according to Mr. Terry, the city can give the bankers no such assurance.

Since the railway began to run behind, the city treasury has been cashing warrants as pay to railway employees with the result that the overdraft against the railway on the treasurer's books now stands at approximately $500,000.

Mr. Terry cited on this point the clause in the ordinance providing for the acquisition of railway lines, which reads as follows:

> The city of Seattle further binds itself to establish and maintain rates for transportation upon such municipal street railway system which shall provide sufficient revenue to permit such sums being paid into such special fund which the city has pledged to be set aside semi-annually for interest, and annually for principal, to be applied for the payment of principal and interest of the bonds herein authorized, until such bonds have been paid in full, and in addition thereto all costs, of operation and maintenance, and all bonds, warrants and indebtedness for which any revenues of such system have heretofore been previously pledged.

Mr. Terry says:

> On the strength of this stipulation the banks have been advised that moneys cannot be raised by taxation for the operation of the railway, or payment of the bonded indebtedness without the direct vote of the people. That is why they will not honor railway warrants, if it comes to that. They have no assurance that the money could be raised by taxation.

A petition calling upon the Council to submit the fare increase ordinance to a vote of the people was begun one week ago, and if approximately 6,800 signatures of qualified electors are placed thereon, the Council will be required to submit the fare ordinance either at the next regular municipal election or at a special election called for that purpose. According to the charter, the petition, if filed before July 19, the date the fare bill would otherwise become effective, will postpone fare increases on the railway until such time as the election is held on the matter.

Will War on Jitneys

Jitney competition must cease in Kansas City, Mo. This is the decision announced by the management of the Kansas City Railways after an exhaustive study of traffic conditions throughout the city. The traction officials have come to the conclusion that if the company is to continue to furnish adequate service at a reasonable rate of fare the jitneys must go. They have announced that the company will use every legitimate means at its disposal to drive the jitneys from the streets, and that to accomplish this end they will "fight to a finish."

Announcement of the company's new policy follows the completion of traffic checks by John A. Beeler. These checks showed that the buses were largely responsible for congestion in the business district of the city. Jitneys cause, by actual count, from 37 per cent to 52 per cent of the downtown vehicular congestion. Such a situation is, according to the company, not to be tolerated.

The City Council on May 24 passed an ordinance providing for a "jitney trail" around the downtown business district. Under the terms of the measure a line is established which the buses will be compelled to follow. The area within specified boundaries is described as the "congested district," from which jitneys will be barred between hours of 6 a.m. and midnight. The measure prescribes the same routes for jitneys as now exist until they reach this "congested" zone, when they will have to "hit the trail" and circle the control district.

The company announced its 'Anti-Jitney Campaign in a statement in a recent issue of the *Railwayan*, its official publication. This statement was concluded as follows:

> In the end the public must choose between transportation monopoly or transportation furnished by a street railway company charging the minimum fare, with universal transfers on a basis of actual service at cost, operating non-paying lines for the benefit of the growing residence districts, continuing non-rush and wol car service, and suppiying the transportation needs of the city from the standpoint of the greatest good to the greatest number. The other is transportation competition. In the final analysis it will mean abolishing non-paying lines and the elimination of all unprofitable service, such as owl cars and non-rush. It will mean an increased fare without transfer privileges. It will mean transportation conducted not for the public good nor for public convenience. . . .

No Action on Louisville Request

James P. Barnes, the new president of the Louisville (Ky.) Railway, assumed his duties on July 8. Previous to his arrival the executive committee reported to Mayor Smith following three months' trial operation of the properties. The Council has been asked for an initial 7-cent fare on a service-at-cost plan. The ordinance also provides a $2,000 salary increase for the chairman of the Board of Public Works, and $1,500 for each member, this additional salary to be paid by the railway and the board to become an executive body to aid in the management of the company.

The members of the Board of Councilmen and Aldermen appear to be strongly opposed to the plan. After a meeting of the members of the upper and lower boards on July 8 with nine Aldermen present and twenty-one of the twenty-four councilmen in attendance it was reported that practically all of the thirty men opposed the ordinance. Several members contend that service-at-cost is good for the company, and not the public. Objection was also raised to the city going into the railway business. Another objection was that under the service-at-cost arrangement the Board of Public Works would practically be placed in the position of employees of the railway.

No action is expected before the next regular meeting on July 20. The matter is now in the hands of the railroad committee of the General Council.

City Appeals Milwaukee Fare Increase

An appeal by the city of Milwaukee, Wis., from the recent order of the Wisconsin Railroad Commission granting the Milwaukee Electric Railway & Light Company an increase in the rate of fare within the single fare area was filed on July 8, 1920, in the Dane County Circuit Court at Madison. According to the City Attorney of Milwaukee the appeal is brought to preserve old questions that are pending before the courts. These are the claims that the company has $4,500,000 in excess earnings and that the 1900 franchise, which provides that the fares shall not exceed 5 cents, is a contract.

An additional point which will be raised in the appeal, according to the City Attorney, is that the earnings of the electric lighting and steam heating departments should be considered as earnings of the company as a whole in determining whether or not it is making a reasonable return on the value of its railway property. The contention is that these departments are mere agencies for the merchandising of byproducts. If it is found that in all of these departments taken together the company will be making a reasonable return, with new wage scale in effect, an increase in fare is not justified.

The order appealed from was reported in detail in the ELECTRIC RAILWAY JOURNAL of July 3, page 42.

New York Situation Complicated

Recent Decision by Court of Appeals Appears to Have Added to Rate Uncertainty

The decision on July 7 by the New York Court of Appeals on the B. R. T. fare case has complicated the situation in New York City as regards fare increases. The decision denied the jurisdiction of the Public Service Commission over fare clauses in franchises granted between Jan. 1, 1875, and July 1, 1907, with three exceptions. The first reaction of the interested parties, the Brooklyn Rapid Transit Company, the Public Service Commission and the city, was one of satisfaction, according to published statements, in that each party considered it had won.

THE decision closely follows the Niagara Falls case and the International Railway where the vital clause reads as follows:

We are now urged to hold that the Legislature intended to delegate the power to the Public Service Commission to modify the rates prescribed in the contract between the local authorities and the railroad company, against the protest of the municipality, notwithstanding the refusal of three successive legislative bodies to accede to such demand for delegation of power. This we are not prepared to accede to.

The court in rendering a decision on the B. R. T. fare case states:

The petitions of the appellants to the Public Service Commission requested an order authorizing the appellant to charge and collect a cash rate of fare of 8 cents for the transportation of passengers "between any two points of any of said lines of railroad" of the company. We construe this as an application for an increase of fare on the entire route and so the record shows that it was construed by counsel.

We think the following classes of franchises fall outside the scope of our decisions in in re applications of the City of Niagara Falls vs. Public Service Commissions of the State of New York for the Second District and the International Railway Company, decided herewith; Matter of Quimby vs. Commission, 223 N. Y. 244:

1. All franchises granted directly by the Legislature.

2. All franchises granted by municipal authorities prior to Jan. 1, 1875. Such franchises are subject to proper legislative regulation.

3. All franchises granted by municipal authorities subsequent to the passage of the Public Service Commission law on July 1, 1907.

4. The following franchises granted between Jan. 1, 1875, and July 1, 1907:

(a) The franchise granted in and by the consent of the Common Council of the city of Brooklyn to the Atlantic Avenue Railroad, dated March 13, 1882 (now a part of the Nassau Electric Railroad Company).

(b) The franchise granted in and by the consent of the Common Council of the city of Brooklyn to the Prospect Park & Coney Island Railroad dated Dec. 21, 1885, consenting to the construction of a line on Park Avenue and other streets in Brooklyn.

(c) The franchise granted in and by the consent of the Common Council of the city of Brooklyn to the Nassau Electric Railroad dated June 19, 1893, covering a number of lines as therein stated.

The orders, therefore, should be affirmed without prejudice to the right of the relator to make separate applications as to the franchises which come within the jurisdiction of the Public Service Commission as herein indicated.

According to one interpretation of this decision many complications will result, as the decision seems to indicate fare increase hearings on individual parts of a system with resultant delays and costly litigation and, in case fare increases are granted, a question as to a workable plan for applying the increases to the system as a whole.

In commenting on the decision Corporation Counsel John P. O'Brien stated:

The franchises which fall outside the scope of the Rochester ruling are so few and so interwoven with franchises, which are plainly controlled by the decision, as to make it practically impossible to work out any increase in fares upon any of the systems of the street railways within the city.

Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, commented on the decision as follows:

It is impossible, in the short time now at my disposal, to apply the decision of the court to each of the lines and separate the different franchises so that the one class which is not under the jurisdiction of the commission can be put by itself. All but a very few of the franchises of these three companies are held to be without the jurisdiction of the Public Service Commission. I shall immediately comply with the privileges extended to me by the court and present to the commission proper application for action in respect of the franchises over which the commission has jurisdiction. Of course, the opinion of the court only dealt with surface lines because only applications of surface line companies were under review. The decisions, therefore, do not directly affect the subway or elevated lines.

The New York *Times* of July 9 editorially says of the decision:

The first prospect is for more litigation and more decisions in some years more, years having been wasted in finding out how to begin. It is certain there is no use in expecting permanent benefits by orders contrary to good business management of a matter which is rightly more a matter of business than of law. Nothing prevents reasonable men from altering a contract, and when a contract cannot be altered because one of the parties to it will not consider the matter for reasons outside the contract, that is unreasonable conduct. By standing immovable on its subway contracts the city has stopped the construction of the very roads on which it demands that a nickel fare shall be charged. The one sure thing is that, whatever the law in any particular case, the people will not long get more than they pay for, including a profit to the suppliers of the service, which is valued more as it takes its flight.

Public Service Commissioner Lewis Nixon stated that the decision was a complete victory for the commission. He believed that twenty-four companies in the city in whole or in part would be under the jurisdiction of the commission as regards rates.

Asks Increase in Illinois

Facing a greatly increased labor charge from the 70-cent-an-hour wage scale allowed trainmen by a board of arbitration recently, the Tri-City Railway of Illinois has been forced to petition the Illinois Public Utility Commission for an emergency fare of 8 cents and for a permanent fare of 10 cents with three tickets for a quarter.

This action was predicted by C. E. White, who represented the company on the board of arbitration. He refused to sign the majority report of the board, holding that the 70-cent wage scale would compel a raise in fares.

This increased revenue must be secured or the current payroll with its big advance cannot be met, company officials state. They asked that the emergency fare take effect July 10 and that the hearing on the permanent fare be set as soon thereafter as possible.

Only recently the commission granted the company an extension of the 7-cent fare to Sept. 30.

The municipalities of Moline, Rock Island and East Moline, Ill., which will be affected by the increased fare, while not objecting to the 70-cent wage award, have announced that they will fight an increase in fare.

The company will have to ask for an increase in fares in Davenport, but will take no action until the audit and appraisal now being conducted by the city on all public utility companies is completed.

Company officials hold that the City Council of Davenport must grant increased rates at that time, as their own figures will indicate both the railway and other local utilities are not receiving a sufficient return on the investment under present rates.

Eight Cents Now Proposed

Detroit United Railway Would Change the Fare on Non-Franchise Lines —Company's Books Opened

The Detroit (Mich.) United Railway has given notice that it will establish a new rate of fare at 8 cents for cash fares and seven tickets for 50 cents, effective at midnight on July 31. The new rate is asked on all non-franchise car lines in the city in an amendment filed to its bill in the case pending before Judge Jayne in the Circuit Court.

The court is asked to decide whether or not the proposed rate of fare is reasonable. An injunction is asked by the railway to restrain the city from passing on the reasonableness of the rate of fare and it is also asked that the city be enjoined from urging the people not to submit to the fare.

The company's action is considered by Corporation Counsel Wilcox as a step in following out the agreement reached by the city and the company in recent conferences with the court. The action is taken, it is believed, to establish a legal issue in Judge Jayne's court on which the court can determine if it has the authority to pass on the reasonableness of any fare, and if such authority is vested in the court a uniform rate of fare for all city lines can be fixed which will yield revenue sufficient to pay the company a fair return on its investment.

The city will file an answer to the company's amended cross bill before July 31 asking that the company be enjoined from charging the proposed increased rate of fare, according to Mr. Wilcox. The legal issue thus established will be threshed out in the court.

In accordance with the agreement, the Detroit United Railway will open its books for examination by the court. A uniform rate of fare will be suggested by the court to apply on all lines, both franchise and non-franchise. Both the city and the company have agreed to abide by the court's decision, although both sides reserve the right to cancel their agreements at any time. Neither side is to forfeit any of its existing rights by this agreement.

Transportation News Notes

Six Cents Asked in Wichita Falls.—The Wichita Falls (Tex.) Traction Company has applied to the City Council for permission to increase fares 1 cent. The present fare is 5 cents.

Eight Cents Asked in Bangor.—The Bangor Railway & Electric Company, Bangor, Me., has applied to the Public Service Commission to increase its rates of fare from 6 cents to 8 cents. The commission fixed on July 14 as the date for a public hearing.

Asks Seven-Cent Rise.—The Northern Ohio Traction & Light Company, Akron, Ohio, has applied to the City Council of Massillon, Ohio, for permission to raise fares on the Massillon city lines from 5 cents to 12 cents. The company proposes to sell five tickets for 50 cents.

Must Have More in Marshall.—The Marshall (Tex.) Traction Company has made application to the Marshall City Commission for authority to increase its fare from 7 cents to 10 cents. The fare was increased from 5 cents to 7 cents about a year ago on authority granted by the commission. The company asserts that it is operating at a monthly loss of $645.

Fares Increased at Calgary.—Higher fares are in force on the Calgary (Alta.) Municipal Railway. The new schedule provides for a 10-cent cash fare, and a system of tickets graduated up to twenty tickets for $1. It was adopted in an endeavor to avoid the deficits that would be shown if a sufficient sum for depreciation were charged.

Supervisor for Trenton Utilities.—The office of supervisor of public utilities has been created by the city of Trenton, N. J. The supervisor will have as his duties the work of inquiring into complaints relative to the operation of electric railways and other public service corporations. No appointment has yet been made for the position.

Ten Cents Asked in Aurora.—The Aurora, Elgin & Chicago Railroad, Aurora, Ill., has petitioned the Illinois Public Utilities Commission for an increase in fare on its lines in Aurora and Elgin from 8 cents to 10 cents. The fare increase is asked to enable the company to meet the new wage scale recently granted the employees of the system.

Tokens in Buffalo.—Arrangements are being made by the International Railway, Buffalo, N. Y., for the substitution of metal tokens instead of the tickets now issued at the rate of four for 25 cents. It is planned to make the change about Aug. 1. The metal tokens would be placed in the fare boxes. The high cost of printing tickets is given as one of the reasons for making the change.

Seven-Cent Zones Allowed. — The Board of Public Utility Commissioners of New Jersey has issued an order allowing the Monmouth County Electric Company to increase fares from 6 cents to 7 cents in each of its zones. The rate was originally 5 cents, but was increased by the order of the commission last October. The company had asked for an 8-cent fare. The railway is in the hands of receivers.

Special Edition of "Two Bells."—The patriotism of the employees of the Los Angeles Railway is reflected in the Fourth of July edition of *Two Bells*, the railway's publication. Both in appearance with its red, white and blue border and in its contents, where the brave deeds of its men during the World War are heralded, No. 5 is an interesting pamphlet for those inside and outside of railway concerns.

Wants More on Narrow Gage.—The Boston, Revere Beach & Lynn Railroad has petitioned the Massachusetts Department of Public Utilities for authority to discontinue the commutation tickets it is now selling on its narrow gage electric line in Winthrop at the rate of ten rides for 85 cents. As two tickets are now collected for each ride between Boston and Lynn, the change petitioned for would entail a 20-cent fare.

Seeks More on Penn Line.—Notice of an advance in fares from 8 to 10 cents and of an increase in the rate for workmen's tickets from 5½ cents to 7 has been filed with the Pennsylvania Public Service Commission by the Lykens Valley Street Railway operating between Lykens, Dauphin County, and Reinerton, Schuylkill County. The new rates become effective July 1 and remove all limitations on workmen's tickets, making them good until used.

Asks Ten Cents in Lewiston.—An increase in fare from 7 cents to 10 cents is asked in a petition filed recently with the Maine Public Service Commission by the Androscoggin & Kennebec Railway, Lewiston, the successor to the Lewiston, Augusta & Waterville Street Railway. The company's petition points out that there was a deficit of $62,682 during the first five months of the year and that the increase is necessary to the continued successful operation of the road.

Hearing on Rate Petition.—H. C. Dillon, examiner for the Illinois Public Utilities Commission, recently heard petitions of the East St. Louis & Suburban Railway, East St. Louis, for permission to increase rates. The value of the company's property was placed at $1,988,962 by H. E. Bartlett, engineer for the commission. Officials of the company stated this valuation was too low. This petition for permission to increase rates has been before the commission since 1918.

Wants Youngstown Fares Reduced.—Street Railway Commissioner W. L. Sause has demanded that fares on the Youngstown (Ohio) Municipal Railway be reduced from 9 to 8 cents as the result of alleged disclosures made by the arbitration proceedings to determine an operating and maintenance allowance for the railway, which operates under a "service-at-cost" franchise. The carfare was raised to 9 cents about four weeks ago.

Increase on Interurban in City Sustained.—The Appellate Division of the Supreme Court declared on July 2 that the New York, Westchester & Boston Railway has the right to charge a 7-cent fare within the limits of the city of New York. It operates lines between the Harlem River and points in Westchester County. The court decided that the Public Service Commission has authority to permit the collection of such fare within the boundaries of this city.

Troy Lines Going Behind.—The United Traction Company, Albany, N. Y., has filed a petition at the city clerk's office in Troy, asking that the Troy Common Council repeal the ordinance limiting the fare to 7 cents and enact one that will allow the company to petition the Public Service Commission for an increase. The amount was not mentioned. It is believed in Troy that the company will ask a 10-cent rate. In its petition the company notified the city that it has a deficit of $100,841 so far this year.

Ten-Cent Fare Put Off.—On June 16 the period of five months expired in which the city was to agree with the Tacoma Railway & Power Company, Tacoma, Wash., upon a new rate of fare. When notified by the Public Service Commission that the time limit set by it was up, the city obtained from the company an extension until July 2, when the matter will go before the commission for argument. In view of these circumstances, the plan to put the 10-cent fare into effect has been postponed for the present.

Bus Compromise Reached.—As the result of an agreement reached between Grover A. Whalen, Commissioner of Plant & Structures of New York City, and John J. Kuhn, receiver of the Richmond Light & Railroad Company, operating on Staten Island, municipal bus routes paralleling the company's lines will be allowed to continue operation for the present. The buses will also be permitted to run on the viaduct where the company has exclusive rights. The arrangement was made with a view to serving the needs of the Staten Island public.

Fare Increase Necessary in Syracuse.—So far as the Syracuse lines of the New York State Railways are concerned the wage award referred to in the ELECTRIC RAILWAY JOURNAL for July 3 will add $361,000 to the platform expenses of the company for the coming year. The present 6-cent fare will be inadequate to meet this added charge.

The company has estimated that at least 8 cents from each passenger will be required. As an alternative to such charge a service-at-cost arrangement has been suggested.

Fares Up on Interurban.—A ruling by the Missouri Public Service Commission on June 10 granted an increase of rates to the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, on the Savannah interurban line. The company is authorized by the commission to put into effect for a period of seven months from July 1 the following schedule: St. Joseph to county line, 10 cents; to Avenue City stop, 16 cents; to Holland stop, 24 cents; to Young stop, 30 cents, and Savannah, 36 cents. At the end of seven months the schedule must be reduced to the present rates.

Seven Cents in Grand Rapids.—A 7-cent cash fare was placed in effect on the lines of the Grand Rapids (Mich.) Railway on June 24. On the same date the company began rerouting a number of its lines. Tickets are sold on the cars and in drug stores throughout the city at the rate of sixteen for $1. The fare formerly was 6 cents. The increase was authorized by the City Commission on May 24, the company at the same time being ordered to improve its service. The commission reserves the right to revoke the higher fare grant if the service furnished by the railway is not improved.

Accepts Six-Cent Fare Grant.—The Texarkana Traction Company, operating in Texarkana on both sides of the Texas-Arkansas State line, which recently sought authority from the city governments of both parts of Texarkana to increase its fare from 5 cents to 7 cents, has declined to accept the 6-cent fare offered by the Arkansas side of the city. The proposed increase is to remain in effect for six years, and then the fares were to revert to 5 cents. The Texas side of the city was also disposed to offer a 6-cent fare to be effective for six years, but it has as yet taken no official action to that effect.

Auto Drivers Warned.—Automobile owners of San Diego, Cal., have received from the San Diego Electric Railway a circular letter advising them that they are liable for damages suffered by occupants of their cars involved in an accident. The company points out that it has been determined by the court that the owner of an automobile who invites another to ride with him is personally responsible for his safety. Although the company's financial condition has improved considerably since the introduction of the two-zone system last January, it is at present running short of actual operating requirements by $500 a day.

Wants Fare Increase in Sandusky.—A 7-cent fare, with four tickets for a quarter, is facing the citizens of Sandusky, Ohio, on the city lines there operated by the Lake Shore Electric Railway. City Commissioners have been asked to ratify this change in fare at their next meeting. The present fare is 5 cents, with six tickets for a quarter, and free transfers. The transfer privilege would be continued under the new fare arrangement. F. W. Coen, vice-president of the Lake Shore, declares the company cannot meet the running expenses of its city cars unless the increase is granted by the commissioners.

Wants 10 Cents in Durham.—Claiming that it lost $61,452 on its investment during 1919, the Durham (N. C.) Traction Company has filed a petition with the State Corporation Commission asking that it be allowed to increase its fares to 10 cents, or sell three tickets for a quarter. The petition of the company points out that in 1915 the net income from operation of its system in Durham lacked $16,000 of meeting the 8 per cent allowed for its investment. These figures were doubled in 1916. A slight reduction was registered the next two years due to the increase of the fare from 5 cents to 7 cents, but the figures again jumped in 1919 when the total loss on the investment value was about $61,000.

Mayor a Central Figure at Hearing.—Hearings have been resumed in the petition of the Georgia Railway & Power Company, Atlanta, Ga., before the State Railroad Commission, in the company's quest for increased fares and increased rates for gas and electricity. The case seems to have developed into a two-cornered fight with the company on the one side and Mayor James Key and Joel Hurt, a former president of the railway which was acquired by the reorganized corporation, on the other side. Preston S. Arkwright, president of the company, testified that the Mayor's enmity toward the company dates from 1904. The company is seeking to increase its fares from 6 cents to 8 cents.

New York Transfer Charge Continued.—Alfred M. Barrett, Acting Public Service Commissioner, signed an order on July 6 continuing indefinitely the permission given a year ago to the New York Railways to charge 2 cents for transfers at 99 of the 113 points of the system throughout the city where free transfers once were issued. In continuing the privilege Commissioner Barrett acted upon a report by officials of the commission that an additional charge for transfers was still necessary for the prosperity of the company. Instead of extending the privilege for a year, however, the commissioner made it for an indefinite period so that it could be withdrawn at the will of the commission.

Beach Riders to Pay More.—The Atlantic City & Shore Railroad, Atlantic City, N. J., has received permission from the State Board of Public Utility Commissioners to raise its fare from 6 cents to 7 cents. The Central Passenger Railway, operated by the Atlantic City & Shore, has also been authorized to raise its fare and to sell tickets good for 100 rides between Atlantic City and Longport for $7.50. The new rates went into effect on July 1. The board has refused permission to the Jersey Central Traction Company, Keyport, to raise its fare from 7 cents to 10 cents in each zone. The board has also denied an application of the Monmouth County Electric Company, Red Bank, for an increase in fare from 7 cents to 8 cents.

Court Refuses to Restrain Fare Advance.—Supreme Court Justice Tierney has denied the application of the city of New York for an injunction to restrain the Richmond Light & Railroad Company, Staten Island, N. Y., from charging more than a 5-cent fare. Under an order of the Public Service Commission, which the Corporation Counsel asserts is in violation of city contracts, the railroad is now collecting an 8-cent fare on its lines. Justice Tierney also handed down a decision refusing the city's petition for a writ of prohibition to forbid the Public Service Commission from entertaining the application of the Staten Island Midland Railway which has not operated its cars since Jan. 2, to permit the company to charge an 8-cent fare. The court held that some of the franchises under which the companies in Staten Island are operating do not require the carrying of passengers over all parts of the line for a single fare of 5 cents. Some of the franchises have no condition as to fare.

"Jim Crow" Law Upheld.—The Supreme Court of the United States has handed down a decision upholding the provision of a "Jim Crow" law of the State of Kentucky so far as it affects the lines of the South Covington & Cincinnati Street Railway and the Cincinnati, Covington & Erlanger Railway, a subsidiary, Covington, Ky. The company was indicted for violating a statute requiring companies operating railroads in the State to furnish separate coaches or cars for white and colored passengers. The company appealed to the United States Supreme Court from the Court of Appeals of the State of Kentucky, alleging that it was an interstate carrier and so did not come within the provisions of the act. In support of this contention it was stated that the company was engaged in interstate commerce, carrying passengers between Cincinnati and the cities across the Ohio River, and that 80 per cent of the passengers carried were interstate. The reply made by the State and expressed by the Court of Appeals was that the railway is a Kentucky corporation and by its charter was given authority "to construct, operate and manage street railways in the city of Covington and vicinity." The Supreme Court held that there was a distinct operation in Kentucky, authorized and required by the charter of the company, and it was that operation which the act in question regulated, and, therefore, the latter was not a regulation of interstate commerce.

Legal Notes

ARIZONA—*Liability for Negligence Resulting in Aggravation or Recurrence of Disease.*

Where a person suffering from tuberculosis was thrown from a car, the railway cannot claim immunity for its negligence resulting in recurrence or aggravation of the disease, because the passenger was already suffering from it; the gist of the action being the loss suffered by the injured person, caused by the defendant's negligence. [Tucson Rapid Transit Company vs. Rubiaz, 187 Pacific Rep., 568.]

CONNECTICUT—*Employment of Incompetent and Inexperienced Trainmen Not in Itself Negligence.*

In an action for injuries to a man on the track, an instruction authorizing the finding of negligence because of the employment by the railroad of inexperienced and incompetent trainmen, without regard to whether the accident was the result of some negligent act of the trainmen, was prejudicial error. [Carlson vs. Connecticut Company, 108 Atlantic Rep., 531.]

MINNESOTA—*City Collecting Cost of Street Paving from Property Owners Cannot Recover from Railroad.*

After a city has assessed the cost of repaving a street on abutting property owners and has thereby become fully reimbursed for its expenditure it cannot require a railway company to pay the cost of the paving done on the portion of the street occupied by its tracks. [City of Duluth vs. Duluth Street Railway, 176 Northeastern Rep., 47.]

MISSOURI—*The Creditor of a Corporation Whose Assets Have Been Transferred to Other Creditors Without Consideration Could Follow Assets.*

Where a corporation took over the assets of another corporation having the same officers and almost identically the same directors and stockholders without payment of full consideration therefor, and where the difference between the amount paid and the actual value of the assets received was in excess of the claim of a judgment creditor of the latter corporation, the judgment creditor could have his claim satisfied out of the assets of the first corporation. [Johnson vs. United Railways, 219 Southwestern Rep., 39.]

MARYLAND — *Obstruction Caused by Newspaper Bundle Thrown from Car.*

In an action against an electric railway company for the death of a motor-truck driver, the wheel of whose truck ran upon a bundle of papers thrown from a north-bound street car, where the real issue in the case was whether the truck driver was guilty of contributory negligence in that the periodicals were lying in the street long enough to have given him an opportunity to avoid them, the court did not err in charging the jury to render a verdict for defendant if they should find "that there was no north-bound car immediately opposite or ahead of the truck at the time the truck struck the bundle of papers." [Kaufman Beef Company, et al., vs. United Railways of Baltimore, et al., 109 Atlantic Rep., 191.]

KANSAS — *Passenger in Automobile Who Could Have Seen Approaching Car in Time to Warn Driver, But Who Did Not, Cannot Recover for Injury.*

A mature person, who attempts to cross an interurban railroad track without taking any precautions for his own safety, while riding in an automobile with another who is driving, cannot recover damages for injuries sustained in a collision with a car on the track, when by looking he could have seen the approaching car in time to have warned the driver of the danger. [Kirby vs. Kansas City K. V. & W. Railway, 186 Pacific Rep., 744.]

MASSACHUSETTS—*Railroad Held Not Negligent in Moving Car Past Place Where Chemical Solution Was Dripping.*

Unless the motorman and the inspector of an elevated railroad knew that chemical compound dripping from the scene of a fire on the elevated structure would probably cause harm to any one it touched, they were not negligent in ordering an open surface car with a passenger aboard to go forward under scene of fire, though drops of solution had not ceased to trickle from structure. [Flaherty vs. Boston Elevated Railway, 126 Northeastern Rep., 798.]

NEW YORK—*Accident to Person on Crosswalk.*

A pedestrian having waited until an approaching street car stopped a yard away, it could not be said as a matter of law that she was guilty of contributory negligence in advancing to cross ahead of it, on a cross-walk, as she could assume the motorman would look before restarting the car. [Lipshitz vs. Third Avenue Railway, 170 New York Supp., 631.]

ILLINOIS—*Presence of Banana Skin on Stairway Insufficient to Support Recovery for Injuries.*

The mere presence on a stairway or stairway landing leading to a station of an elevated railway, of a banana skin on which a passenger leaving the station slipped, did not show negligence, in the absence of evidence of actual knowledge of its presence, or evidence that it had been permitted to be there for a sufficient time that notice might be implied. [Davis vs. South Side Elevated Railway, 127 Northeastern Rep., 66.]

New Publications

Direct Current Motor and Generator Troubles: Operation and Repair

By T. S. Gaudy and E. C. Schacht. Published by McGraw-Hill Book Company, Inc., New York, N. Y. 265 pages.

A practical work for engineers and operators. The book gives a very thorough treatment of motor and generator troubles with remedies and is written in an able manner by experienced men. The book should appeal to the operating engineer and electrician and be useful as a reference book in the technical schools.

Proceedings of Canadian Safety Leagues' Convention

Report of Toronto Convention, 1920, of Ontario Safety League and Canadian National Safety League. Issued by the leagues, 189 St., Toronto, Ont.

The two safety leagues mentioned have issued in pamphlet form the proceedings of a three-day safety convention held at the King Edward Hotel, Toronto, April 13 to 15, 1920. There were fifteen papers read on industrial safety, and an address on the safety movement was delivered by R. M. Little, director Safety Institute of America.

Visualizing Citizenship

By Ina Clement, Municipal Reference Library, City of New York, 32 pages.

In this pamphlet the author has included a list of motion picture films, devoted to civic education and classified according to subject. Its purpose is to give an opportunity to those interested to arrange for the presentation of films for educational purposes. Under public utilities are classified several reels on steam railroad electrification, and a reel on the large steam turbines in the Interborough Rapid Transit power station. "Fares, Please," under which title the safety car film is listed, is also mentioned.

United States Bureau of Standards, Washington, D. C.: Circular No. 83 on Specifications for the Manufacture and Installation of Railroad Track Scales. This circular comprises specifications for the manufacture and installation of railroad track scales to establish a standard for the ordinary railroad freight car weighing throughout the United States. They were prepared by a committee representing the American Railroad Association, the American Railway Engineering Association, the Railroad & Warehouse Commission of the State of Minnesota, the National Scale Men's Association, the Scale Manufacturers Association and the Bureau of Standards. This circular may be obtained upon request to the Bureau free of charge.

Personal Mention

Louisville Welcomes "Jim" Barnes

"Jim" Barnes, known the country over to electric railway men, has taken up his new duties as president of the Louisville (Ky.) Railway. He is making no predictions. Louisville has looked Mr. Barnes over and seemingly approves. To his many friends the following impression of Mr. Barnes from a Louisville paper should prove of considerable interest:

Mr. Barnes looks business and means business. He is the typical "all business" New Yorker, talking just enough to be affable, bald except for a slight fringe of hair beginning to show touches of gray, wearing shell-rimmed glasses, somewhat heavy as to chin and jaw, possessing the comfortable rotundity of a Colonel, tipping the beam at 207 pounds and carrying his flesh well distributed over a height of six-feet-one.

Mr. Barnes arrived in town last night, coming from Schenectady, N. Y., where he had been general manager of the traction system. He did not make any ill-considered statements about the street-car situation here, but indicated that he wished first to accustom himself to his new surroundings.

The meeting of the retiring and incoming presidents was such as to make a lasting impression on the six or seven company officials who were present. Mr. Minary, with the good nature that has characterized him during the last four months and its important changes, gripped his successor's hand, looked up at his serious face and with a suggestion of a quaver in his voice, assured him of his utmost desire to co-operate with him, adding:

"My heart goes out to any man who must take the reaponsibility of the management of a street-car company."

Members of the executive committee who have had charge of operation of the system during the trial period of four months named by Mayor Smith expressed their confidence in the man whom they have selected as the head of the company.

"We think he ranks not only next to the best, as one newspaper reported, but is absolutely the best street-car executive in America," said W. S. Speed, chairman of the committee.

"Yes, that's why we got him," said John W. Barr, member of the committee.

"He is the pick of the country, for we certainly looked them all over," said W. H. Kaye, member of the committee.

James Hamilton, Master Mechanic

James T. Hamilton, recently appointed master mechanic of the New York, Westchester & Boston Railway, was born in Howard, R. I. He received his education in the Cranston High School and the Bliss Electrical School of Washington, D. C. Mr. Hamilton has had broad experience in electrification work. During his summer vacations while at college he was on construction work for the Standard Electrical Company of Providence. In September, 1913, he entered the electrical department of the New York, New Haven & Hartford at the Van Nest Shops, Van Nest, New York. In this department he later was appointed electrical inspector. On May 1, 1917, he became chief inspector. It was in this capacity that he was assistant to the shop superintendent and later through changes in the organization he became assistant to mechanical superintendent. Before taking up work with the New Haven, Mr. Hamilton had been engaged on electrification work with the Westinghouse Electric & Manufacturing Company. Mr. Hamilton succeeds R. R. Potter, who has become connected with the Hudson & Manhattan Railroad, as noted in this paper for June 12.

Mr. Lamb Superintendent of Kansas Interurban

O. S. Lamb has recently been made general superintendent of the Kansas City, Kaw Valley & Western Railway, with offices at Bonner Springs, Kan. Prior to this Mr. Lamb was superintendent of the Union Depot Bridge & Terminal Company, resigning this position the last of April, 1920, to become connected with the Kaw Valley & Western Railway.

Mr. Lamb is known to electric railway men as one of the most capable and efficient operators in the Middle West in his line. Before 1907, when Mr. Lamb entered the electrical field, he was a machinist in railway shops and held a number of responsible positions. In 1907 he joined the Waterloo, Cedar Falls & Northern Railway at Waterloo, Iowa, as master mechanic. Subsequently he took charge of the road as general superintendent, retaining his connection in this capacity until 1917, when he resigned to accept the position of superintendent of the Kansas City & Northwestern Railway. Later in the following year he became connected with the Union Depot Bridge & Terminal Company. Mr. Lamb, in accepting the position of general superintendent of the Kansas City, Kaw Valley & Western Railway, succeeded J. L. Moss, who is now acting as chief engineer of that line.



O. S. LAMB

H. R. Mallison has been appointed purchasing agent of the Montreal (Que.) Tramways.

William J. Rausch has been made chief inspector at the Brooklyn Bridge depot of the Brooklyn (N. Y.) Rapid Transit Company.

V. R. Shick has succeeded G. M. Patterson as traffic manager and purchasing agent of the Fort Wayne & Northwestern Railway, Kendallville, Ind. Mr. Shick has also been made auditor of the company.

John Mooney, depot master of the Flatbush Avenue depot of the Brooklyn (N. Y.) Rapid Transit Company, has been promoted to the position of acting division superintendent at the Flatbush Avenue division.

Dennis J. Cullinan, track foreman, will soon retire from the employ of the Bangor Railway & Electric Company, Bangor, Me., after twenty-five years of service. He had previously worked for the Maine Central Railroad for sixteen years on track work.

William Walker, who recently became connected with the Hartford & Springfield Street Railway, Warehouse Point, Conn., has been given the title of general manager of the company. In an announcement of Mr. Walker's appointment published in the ELECTRIC RAILWAY JOURNAL for June 26, it was stated that he had been made superintendent of the road.

Joseph A. Lyons returned from New York City to Marlboro, Mass., on July 1 to retire from business. Mr. Lyons has accomplished some very big tasks in electric railway construction. Among big contracts handled by him were the Fresh Pond Yard of the Brooklyn Rapid Transit Company, a housing plant at Pelham for the United States Government and the construction of an electric railway from North Adams, Mass., to Bennington, Vt.

Dr. Royal Meeker, United States Commissioner of Labor Statistics, has resigned and will leave for Geneva, Switzerland, July 31, to take up the duties of editor in chief of the monthly bulletin of the International Labor Office of the League of Nations. Dr. Meeker has been secretary-treasurer of the International Association of Industrial Accident Boards and Commissions since April, 1916. In June, 1919, he was appointed by the president a member of the Federal Electric Railway Commission.

Obituary

George A. Chapman, assistant general claims attorney of the Detroit (Mich.) United Railway, died on July 6. Mr. Chapman was a graduate of the University of Michigan, and before becoming associated with the Detroit United Railway was connected with the Cincinnati, Hamilton & Dayton Railroad and the Père Marquette. He entered the claims department of the Detroit United Railway in 1916.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Foreign Demand for Steel Towers Good

Deliveries Are Lengthening Because of Material Shortage, but Prices Are Steady

Steel transmission towers are reported in better demand for foreign work than for domestic. This is especially true of the large units. At the same time there is a fair demand for smaller towers, both tubular and fabricated, and in amounts for use over relatively short distances.

Although European exchange is rather unfavorable, there is some demand at this time from that source, while inquiries are good. Buying prevails in the Far East, Australia, South America and Canada.

Poor condition of traction companies and high rate of borrowing money is the reason advanced for a rather light domestic tower market. The railway companies are interested to the extent of inquiries, and are keeping their plans rather forward for new extensions, but at the last moment the signature is lacking on the dotted line.

There is a shortage of material available for poles, but more particularly for tubular poles. The pipe demand in the oil regions is tremendous, with a consequent reaction on the amount of stock that can be turned into poles. For fabricated poles, supply in some quarters is a little short because of transportation hold-ups.

Deliveries on this material are lengthening and in some cases are running up to six months. At the same time prices are holding rather steady.

Lower Prices on Window Glass Unlikely

Scarcity of Labor and Raw Materials, with Strong Demand, Have Caused Acute Shortage

Prospects of any reduction in window glass prices seem remote, according to reports from the recent annual convention of the National Association of Window Glass Manufacturers, held at Atlantic City. A 50 per cent reduction of domestic production during the war, together with a shortage of labor and certain raw materials and an almost total suspension of the industry in Europe while fighting was going on, has conspired to bring about a serious shortage of glass. This shortage would be so acute as to amount to a famine at present were it not for the bottom having dropped out of the building market.

One of the materials used in glass manufacture is salt cake, and the war led to the discovery of many new uses for this product, one of them being the production of paper pulp. Consequently, salt cake is very hard to obtain. The seriousness of the fuel problem has also been further intensified by proposals to limit the use of natural gas in territories where the supply of this commodity was formerly thought to be illimitable.

Foreign countries are generally clamoring for glass from the United States to be used in their construction programs, but the policy of American manufacturers has been to meet home demands first. European competition is little feared as yet, since slow recovery is being made abroad from the paralysis of the glass industry induced by the war. One encouraging factor, however, is the wonderful progress being made with glass production by machine. A type which has demonstrated its practicability draws cylinders 42 ft. in length up to 31 in. in diameter at the rate of one every twenty minutes. The utmost efforts of men have only produced cylinders up to 6 and 7 ft. in length by hand. A number of machine-equipped plants are being operated during the summer in an effort to catch up with the volume of unfilled orders.

The discount for window glass, single strength, A quality, first three brackets, is 17 per cent; for the same in B quality it is 37 per cent, and for double strength, A quality, all sizes, the discount is 79 per cent. These figures compare with discounts of 77, 77 and 79, respectively, on April 1 last.

Strong Demand Features Market for Special Trackwork

Prices Are Steady and Foresight in Ordering Raw Material Has Enabled Manufacturers to Make Prompt Deliveries

A vigorous demand for special trackwork, coupled with steady prices and excellent deliveries on standard products, characterizes the market for this class of material. One of the representative manufacturers in this field informed the ELECTRIC RAILWAY JOURNAL this week that by ordering raw material six to eight months ahead he has sustained little embarrassment in production and that deliveries can be made on standard layouts in from four to six weeks. This is a very satisfactory situation compared with that prevailing in many other branches of the traction industry. It is not possible to make as good deliveries as the foregoing on special orders, corresponding to unusual or particular layouts in street networks, but even here no serious delay appears to be holding back the completion of necessary output.

Labor conditions are believed to be better in this field than in many others. Wages increased 10 per cent this last spring in one representative mill, but the management states that the output per man is well maintained and the turnover in labor is much below that experienced in some other manufacturing plants of the vicinity. Night work is being done in this plant about three times a week, and the steady conditions prevailing are a great help to both management and workmen. Part of the output of the plant goes to other than electric railway customers, but it is understood that railway payments are being received on good credit bases. The volume of business, both in inquiries and orders, is holding up to normal figures.

Prices are now about 100 per cent above pre-war figures and there seems to be no immediate prospect of their going lower in view of the high cost of labor. In 1918 the raw material prices rose to about 120 per cent above the pre-war figures, but since the armistice a reduction of about 16⅔ per cent has been attained. A good deal of renewal business is being entered on the books of special work manufacturers, and new construction held up by the war bids fair to keep up the sale of this class of equipment for some time to come. It is not customary to maintain factory stocks of special trackwork, so far as can be learned, but the railway companies make a practice of carrying more or less extra material for use in case of emergency calls. Considering the transportation situation between the steel mills and the special material mills, it is surprising that deliveries have been so well maintained to electric railways themselves. Foresight in ordering is the answer.

Electric Locomotives for the Swiss Federal Railways

The first of the fourteen electric locomotives ordered by the Swiss Government in the latter part of 1918 for the Federal Railways (Guebe Valley and Berne-Schwarzenbourg lines) has just been delivered by the builders, S. A. Brown, Boveri & Company, Ba-

den. The new locomotive has successfully passed the tests it was subjected to before acceptance. The average force developed by the locomotive is 1,000 hp. at a speed of 25 miles per hour. The maximum speed attainable is 37 miles per hour. The current used is single phase, alternating at 15,000 volts.

Of the fourteen electric locomotives that have been ordered, seven were to be made by the Swiss Machine & Locomotive Works at Winterthur, Switzerland, and seven by S. A. Brown, Boveri & Company, Baden, Switzerland.

Trolley Cord Market Firm Under Steady Buying

Demand Prevents Quick Deliveries in Quantity—Prices Firm Despite Fluctuating Cotton Quotations

Recent ups and downs in the price of spot cotton have had little effect on the trolley and bell cord market. A representative manufacturer informed the ELECTRIC RAILWAY JOURNAL last week that the cost of yarn to him has not shown much change and that the only recent factor of importance materially affecting prices has been wage advances in the textile field. A price readjustment averaging about 5 per cent increase was put into effect by this concern a few weeks ago. Another large producer of trolley cord and bell rope has made no change in prices since February. Buying on the part of electric railways continues steady, with little increase or decrease over the first half of last year. No immediate price changes are in sight beyond those above mentioned, but in some quarters the opinion is current that if the present dullness in the textile field continues easier quotations may find their way into this branch of the supply market.

Deliveries are running about sixty days on trolley cord, although small shipments can be made very quickly in case of necessity. Factory stocks are very low. Raw material is coming to hand well, both by water routes and by rail freight, in comparison with conditions earlier in the year. Some difficulty is experienced in outward transportation from rope factories.

The higher grades of trolley cord seem to be most in demand at present. The tendency toward purchasing braided cotton cord instead of leather for bell cord continues to be a feature of the market, records of wear and tear showing satisfactory results for the braided material. Approximately the prices of trolley rope and bell cord range from 85 cents to $1.10 per lb., depending on quantity and quality of material. Inquiries are well maintained and there appears to be no present scarcity of labor worth mentioning in this particular field. One of the factors which bears a direct relation to production, however, is the partial shutdown of New England textile mills, with a consequent freeing of supplies of raw cotton needed for bell cord.

Lead Cable Being Bought in Good Volume

Some Mills Booked So Far Ahead Utilities Hesitate to Order at This Time

Power cable orders are being received by the mills in good quantities. Shipments are being quoted in increasingly longer terms, running from three to eight months for paper and lead cable and from six weeks to four months for varnished-cambric and lead cable. A tendency is noted for the orders to run into larger sizes of cable, which forms some check on reports that fiber-conduit orders are also running to larger sizes.

The Middle West is providing the best market, but fair-sized orders are coming from New England, the Atlantic States and the South. Some good orders are coming from electric railroads and street railway companies in the East, South and Middle West.

In at least one case paper-cable producing capacity is sold throughout the best part of the present year, and no orders will be booked beyond Jan. 1, 1921. At the same time, many utilities are unwilling to book orders for shipment as long as six months. Utilities of regular standing at the mill, however, are generally able to squeeze in an order, if necessity warrants, where an outside customer would have to wait his turn.

An interesting trend toward standardization is found in the orders from utilities. Former habits of specifications all their own are being changed, and the engineers are coming to see that they can use cable built on A. I. E. E. specifications as well as that built on their own. The mills are refusing to accept special orders in many instances, and this is helping in the standardization.

New Canadian Firm Will Manufacture Hydraulic Turbines

Rather than import much of their machinery and other apparatus from the United States and Europe, as has been done in the past, power and paper manufacturing interests in Canada have organized the Dominion Engineering Works, Ltd., of Montreal, Que., which has entered into an agreement with the William Cramp & Sons Ship & Engine Building Company of Philadelphia for the exclusive use in Canada and the British Empire of the I. P. Morris designs for waterwheels and other hydraulic machinery. Through this association the Dominion Engineering Works expects to be in a position to supply most recent designs in such equipment and of any size to meet Canadian requirements. Other lines of manufacture will include hydraulic valves, governors and other accessories involved in hydraulic installations, and centrifugal and other pumps. An almost complete independence of Canada in supplying power machinery and equipment is expected to result.

Rolling Stock

Birmingham Railway, Light & Power Company, Birmingham, Ala., will purchase nine side-entrance double truck trailers from the Sheffield Street Railway at a cost of $4,000 each.

Northern States Power Company, Fargo, N. D., placed an order with the National Safety Car & Equipment Company for fifteen new safety cars in the early part of June.

The Connecticut Company has received five more safety cars at Norwich, Conn., for use on the line taken over from the Shore Line Electric Railway of that city.

Track and Roadway

Eastern Massachusetts Street Railway, Boston, Mass.—As soon as it is approved the Eastern Massachusetts Street Railway will start at once laying double tracks on Hyde Park Avenue. It is estimated that the cost will be about $75,000.

Eastern Massachusetts Street Railway, Boston, Mass.—Repairs have been started on the Whitman line of the Eastern Massachusetts Street Railway. This section of rail was in such poor condition that immediate work on it was necessary. The many repair jobs have given an opportunity for work to the men who were thrown out of employment by the discontinuance of freight service.

Municipal Street Railway, Detroit, Mich.—The street railway commission of Detroit has given its final approval to the $1,400,000 worth of grade and steel work for the Detroit city system. This is the first step toward the municipal street railway construction as outlined in Mayor Couzen's $15,000,000 plan.

East St. Louis & Suburban Railway, East St. Louis, Ill.—Harland Bartholomew, City Plan Engineer of St. Louis, Mo., has submitted a survey of the railway situation in East St. Louis to the East St. Louis & Suburban Railway, East St. Louis, Ill. He recommended the construction of a cross-town line and the rerouting of the Rosemont line over the Eighteenth Street route, connecting at Twenty-fifth and Lynch Streets with the tracks of the cross-town line.

Northern Texas Traction Company, Fort Worth, Texas.—The Northern Texas Traction Company will double-track its interurban line between Fort Worth and Dallas, about 35 miles.

Northern Texas Traction Company, Fort Worth, Texas.—The Northern Texas Traction Company has begun the work of installing new steel and special construction at the intersection of Front and Main Streets. New track work between Sixth and Weatherford on Commerce, the Railroad Avenue and Wheeler Street connection and double

tracking on the Polytechnic, Hemphill and Summit Avenue lines will be begun shortly.

Northern Texas Traction Company, Fort Worth, Texas.—The building of a car line from the present terminus of the Rosen Heights line to Lake Worth, a distance of three miles, is proposed. The matter has been taken up with the officials of the Northern Texas Traction Company. The company now maintains a line of automobile buses from the end of the car line to the lake.

Northern Texas Traction Company, Fort Worth, Texas.—The Northern Texas Traction Company is making extensive improvements on the interurban line between Fort Worth and Dallas. Ultimately a double-track line between Fort Worth and Dallas will be built. Already more than one-half the line is double-tracked, and the company is now double-tracking another long stretch and straightening curves. The work is being done at a cost of several hundred thousand dollars.

Burlington Traction Company, Burlington, Vt.—The Burlington Traction Company expects to relay two miles of track with 70-lb. steel rail, 33-ft. and 70-ft. lengths.

Monongahela Valley Traction Company, Fairmont, W. Va.—Plans are under way for the removal of the tracks in Mannington on East Market and Main Streets.

Power Houses, Shops and Buildings

Evansville & Ohio Valley Railway, Evansville, Ind.—The power house of the Evansville & Ohio Railway, located 10 miles beyond Newburgh, will be dismantled shortly and shipped to the Monterey Steel Company, Monterey, Mexico. This steel company has recently purchased same.

Schuylkill Railway, Girardville, Pa.—The Schuylkill Railway has recently constructed a new substation at Girardville, and will obtain power at 66,000 volt. The station contains two Westinghouse 500-kw. rotaries with the necessary transformer and switchboard apparatus. The transformer is a 31,000-kva., 66,000-volt to 6,600-volt. A new 500-kw. rotary has also been installed in the Frackville substation with new switchboard and transformer.

Public Service Commission of Indiana.—The Public Service Commission of Indiana has approved the schedule of power rates proposed by the city light and traction power companies. That is, for each five cent increase in the average monthly cost of coal above $3.60 per ton delivered at the power stations there will be added to the monthly bill 15-100ths of a mill per kw.-hr. over and above present power rates. There will be a similar decrease when coal is delivered at a cost less than $3.40 per ton. This coal clause became effective July 1.

Trade Notes

The Roller-Smith Company, 233 Broadway, New York City, held its annual sales conference at its works at Bethlehem, Pa., on June 14, 15 and 16.

The Habirshaw Electric Cable Company, 10 East Forty-third Street, New York City, is planning an extension, 60 ft. x 100 ft., one story, to its plant at Glenwood, Yonkers, N. Y., to cost about $30,000.

The Carborundum Company, Buffalo Avenue and Eighteenth Street, Niagara Falls, N. Y., has made arrangements for rebuilding the portion of its works recently destroyed by fire. The cost is estimated at about $50,000.

The Ajax Electric Specialty Company, St. Louis, Mo., is issuing $100,000 in 8 per cent cumulative preferred stock and $5,000 in common stock in order to permit the company to increase its facilities to handle the business in view.

The Hopewell Insulation & Manufacturing Company, Hopewell, Va., will soon place in operation a plant for the manufacture of hard-rubber, composition and molded insulated parts and high-tension insulators for wireless and transmission purposes.

J. E. Jennings, vice-president and secretary of Milliken Brothers Manufacturing Company, New York City, has recently sailed for Europe for an extended tour. The company has recently secured a large European contract for galvanized-steel transmission towers.

The Wagner Electric Manufacturing Company, St. Louis, has established a general service station at 501 Broadway, Milwaukee, Wis., in charge of S. B. Moyer. The sales office in the First Wisconsin National Bank Building, Milwaukee, under the management of F. T. Coup, will be continued.

The Westinghouse Electric International Company, East Pittsburgh, Pa., has appointed the following as foreign managers: F. M. Rodgers, London, England, European manager; J. W. White, Royal Bank of Canada Building, Havana, Cuba, manager for Cuba, and L. T. Peck, Bartolome Mitre, 754, Buenos Aires, manager for Argentina.

J. H. Williams & Company, Brooklyn, N. Y., announces that the drop-forging business and plants of the Whitman & Barnes Manufacturing Company at Chicago, Ill., and St. Catherines, Ont., Canada, have been combined and are operated by that company. The organization includes the individuals heretofore identified with both concerns.

The General Electric Company, Schenectady, N. Y., has awarded contract for construction of a one and two-story machine shop, 230 x 900 ft., at Erie, Pa. The total cost is estimated at about $1,000,000.

The Midstates Engineering Company, Westminster Building, Chicago, has recently been incorporated as consultants, specializing in industrial power and plant engineering. The engineering work will be in charge of R. J. Gaudy, president, who is known through activities with the Sessions Engineering Company and his connection with many engineering projects.

The American Insulator Company, New Freedom, Pa., with sales offices at 30 Church Street, New York City, and Detroit, Mich., announces the opening of another factory at Norwalk, Conn., in addition to expansion in production capacity at New Freedom, to meet the requirements of its rapidly increasing business.

American Brake Shoe Foundry Company stockholders have approved the plan calling for a readjustment of the company's capitalization. The proposal of the directors provides for an issue of $10,000,000, 7 per cent cumulative preferred stock redeemable at 110 at option of the company, and 400,000 shares of common stock of no par value.

Parsons, Klapp, Brinckerhoff & Douglas, formerly Barclay, Parsons & Klapp, announce the removal of their general and engineering offices from 60 Wall Street to their own building at 84 Pine Street, New York City; also the executive offices of their subsidiary and operated corporations and properties and the Parklap Construction Corporation.

The Electric Tool Manufacturing Company, Petersburg, Va., has purchased the business of the American Electric Tool Company, including patents, manufacturing equipment, good will, etc. The complete line of electric hammers will continue to be manufactured on a greatly increased scale. Louis Paulero will remain in charge as chief engineer.

The Differential Car Company, New York City, has purchased from the United States government the plant formerly operated by the Grant Motor Company, Findlay, Ohio, for the manufacture of munitions. The company, it is understood, will equip the plant for the manufacture of electrically operated dumping cars, dumping bodies for motor trucks, etc.

The Worthington Pump & Machinery Corporation, 115 Broadway, New York, announces the purchase from the Platt Iron Works, Dayton, Ohio, of their drawings, patterns, jigs, templates, special tools, good will and name on the following lines of product: Oil-mill machinery, hydraulic turbine and waterwheel line, feed-water heaters and high-pressure air compressors.

New Advertising Literature

The Metal & Thermit Corporation, New York, N. Y., has issued the third edition of its pipe welding pamphlet, No. 16. The new edition describes and illustrates how pipe welds are made and gives tensile strength and comparative cost data of Thermit pipe welds against ordinary flange connections.

As Inseparable as Nip and Tuck



Hue and cry, flotsam and jetsam, Tom and Jerry, law and order, Babe Ruth and home runs are

Peacock Brakes and Safety

They have been the closest of friends for nearly 20 years on every kind of electric car from smallest single-trucker to the biggest rapid transit rolling stock.

Because the Peacock is not an ornamental brake but a real brake that can be applied with ease and with ***success*** for either the occasional ***emergency*** stop or for hundreds of ***service*** stops a day.

Peacock Brakes will make your Safety Cars Safer Still.

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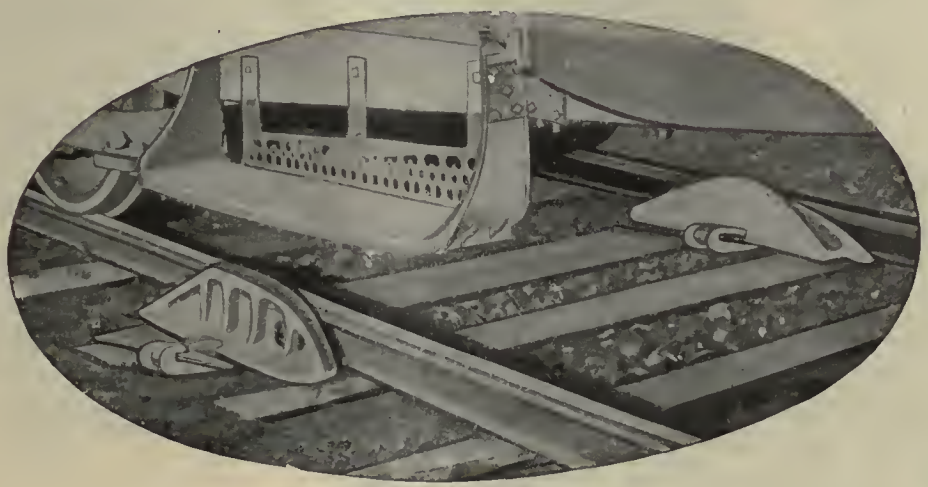
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FARES AND BUSES

More revenue from *more* riders

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Traffic investigations, operation, rates, schedules, management, appraisals, Finance, industrial plants, railway problems, reorganizations.

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Traffic checking and investigations, and inside men.

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THE P. EDWARD WISH SERVICE

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Street Railway Inspection

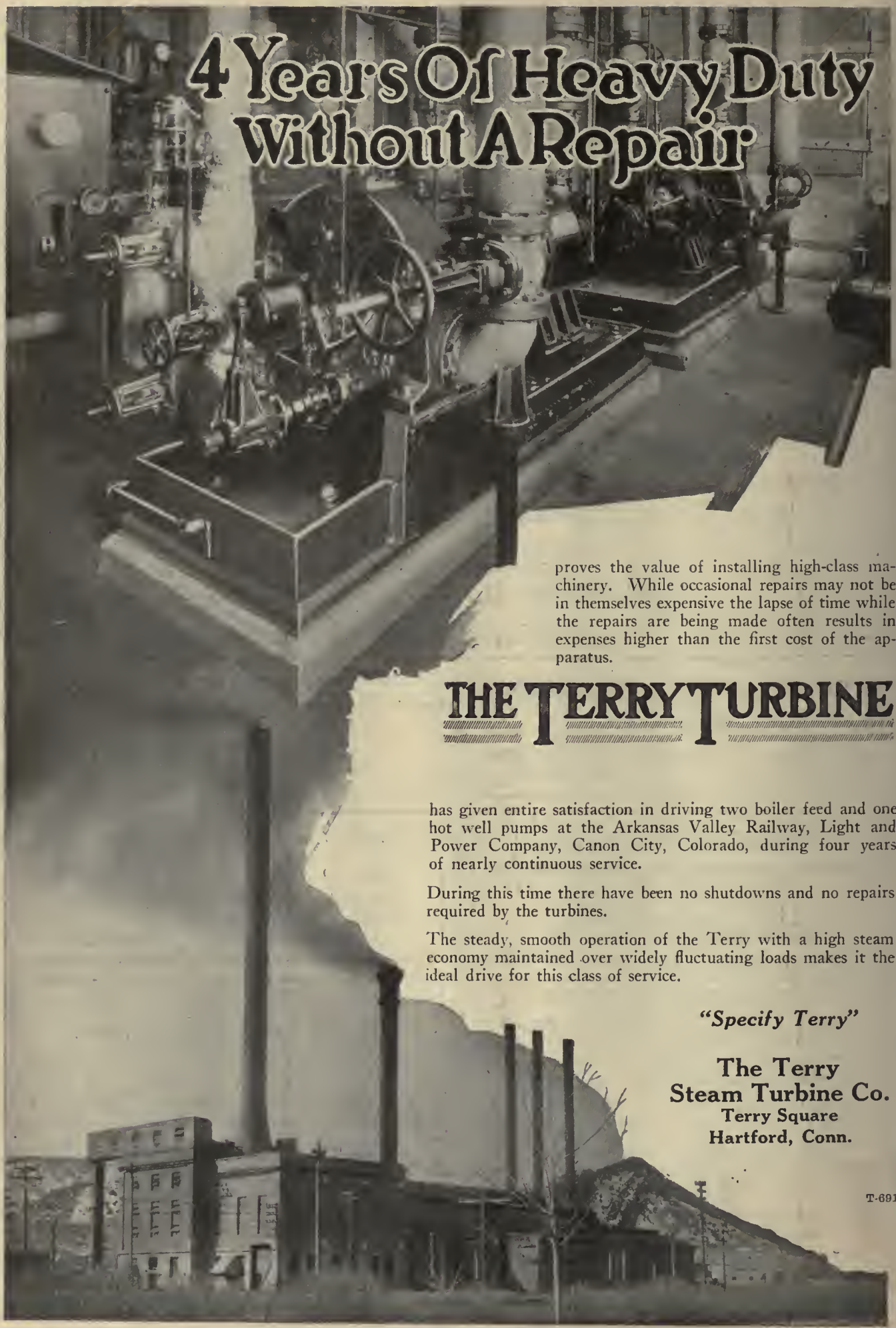
131 State St. BOSTON

The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



4 Years Of Heavy Duty Without A Repair

proves the value of installing high-class machinery. While occasional repairs may not be in themselves expensive the lapse of time while the repairs are being made often results in expenses higher than the first cost of the apparatus.

THE TERRY TURBINE

has given entire satisfaction in driving two boiler feed and one hot well pumps at the Arkansas Valley Railway, Light and Power Company, Canon City, Colorado, during four years of nearly continuous service.

During this time there have been no shutdowns and no repairs required by the turbines.

The steady, smooth operation of the Terry with a high steam economy maintained over widely fluctuating loads makes it the ideal drive for this class of service.

"Specify Terry"

The Terry Steam Turbine Co.
Terry Square
Hartford, Conn.

T-691

—how individual lubricating service reduces lubricating costs . . . . .

Life of Bearings Increased

The effect of Tulc on bearing wear is especially noticeable on modern side feed motors.

Micrometer measurements of bearings of the C.E. Ry., bronze type bearing using Tulc show a wear of .0069-in. This same type bearing using oil shows a wear of .0345-in. or about five times as much.

Sufficient measurements were made to make this ratio certain and in all cases at 30,000 miles service.

Increased life of bearings is but one of the economies made possible by the use of Tulc. Complete data will be found in our booklet "Results."

Write for a copy

The Universal Lubricating Co.

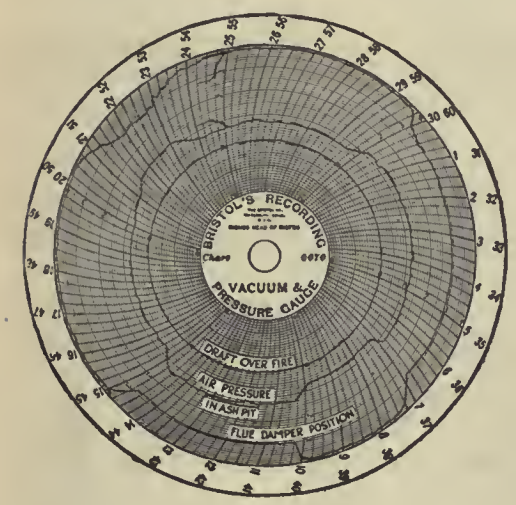
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Factory: Sweeney Ave. Office: Schofield Bldg.

TULC+Universal Service

Handling the Load With Fewer Boilers Or Less Fuel -- --

The Economies Effected by Stabilized Furnace Pressure



Balanced Draft Graphically Illustrated

The outside curve represents the movement of the flue damper in the boiler

The middle curve represents the ashpit pressure, and is given as stated in "inches head of water."

The inner curve shows the pressure prevailing above the fire in the furnace chamber. This curve indicates that throughout, variations in pressure were not more than .02, demonstrating that any predetermined pressure may be maintained uniformly in the furnace chamber for all rates of combustion.

THE economies possible in the **use** of steam are familiar enough. But it is only lately that economies in its **generation** have received the attention justified by their importance. How important they are has been emphasized by the amazing fuel saving accomplishments of

Balanced Draft

Produced exclusively by The Engineer Company

The Furnace Pressure Regulator is a sensitive yet rugged device which, through control of the damper movement, maintains a constant predetermined draft for all rates of combustion.

The variable draft of the hand controlled furnace sucks cold air in through every crack and opening in the boiler setting. With draft maintained constant at slightly less than atmospheric pressure this is impossible, and the gases, being undiluted, maintain the maximum temperature. This stabilization of draft also decreases the velocity of gas movement through the setting, diffuses hot gas to every inch of the heating surface and permits maximum absorption by the tubes.

Thus a higher rate of perfect combustion, permitting the use of mixed and cheaper fuels; and a slower velocity of gas movement, permitting more complete heat absorption, have in many instances increased boiler efficiency as much as 50%.

Balanced Draft can also be coupled with the stoker and thus keep every element of combustion in perfect step.

The installation is simple and requires no change in the boiler setting.

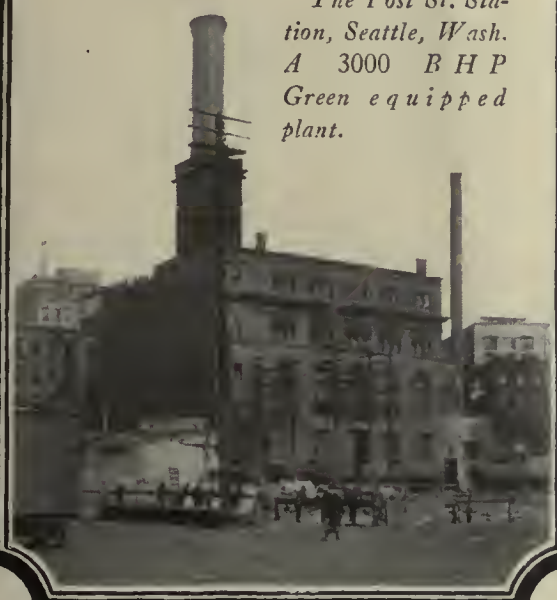
Write us today for our illustrated booklet which describes in detail this better system of combustion.

The Engineer Company

17 Battery Place, **Turner Baffle Walls** New York City

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The Post St. Station, Seattle, Wash. A 3000 B H P Green equipped plant.

Green efficiency is net efficiency

Green Chain Grates require no power consuming auxiliaries because they utilize a basically correct principle of stoker firing —Progressive Combustion.

The driving engine requires only 30 lbs. of steam per hour to operate the largest stoker. This is but a fraction of 1% of the power generated. It means that over 99% is available as productive energy because there are no other steam consuming auxiliaries such as clinker dumps, grinders and side wall steam jets.

In other words, efficiency in the Green sense is *net* efficiency—and *net* efficiency is the only true indication of economy in power plant operation.

The relation of proper coal burning and efficient stoker firing to the cost of producing power is clearly outlined in the Green Book, "Progressive Combustion." Write today for a copy. Address Dept. C.



Driving engine requires but 30 lb. of steam per hour for the largest stoker—no other steam consuming auxiliaries.

No clinker — least attendant labor.

GREEN ENGINEERING CO.

100 Kennedy Ave.
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Backed by 23 Years of Specialized Experience

GREEN Sealflex Arches
GREEN Pressure Waterbacks
GREEN Steam Jet Ash Conveyor
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GREEN CHAIN GRATES



The Philadelphia Traction Company's 100 New Cars are Equipped with

Nevasplit Headlinings

NEVASPLIT is used on the 100 cars ordered through the Emergency Fleet Corporation for operation by the Philadelphia Rapid Transit Co. to the Hog Island Shipyards.

It pays to start right when buying new cars. Replacements are expensive.

Nevasplit Headlining reduces maintenance costs to the lowest degree. Once put up, it stays up without warping or splitting. It is waterproof, reduces the weight of the car and adds safety and beauty to the car interior.

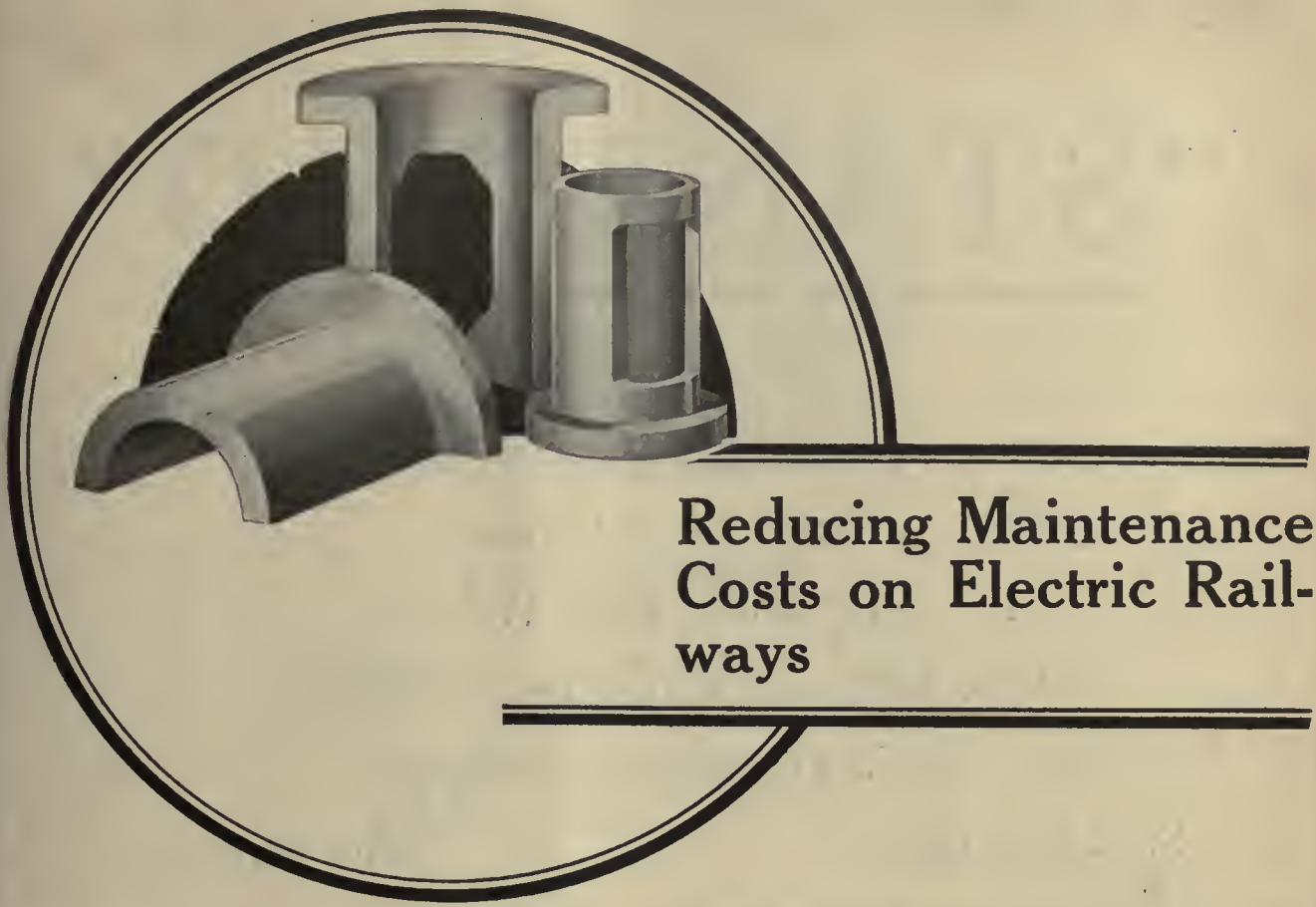
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120 Broadway, New York

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Reducing Maintenance Costs on Electric Railways

Axle and armature bearings of inferior quality are expensive at any price. Their use always incurs unnecessary expense in the way of too frequent bearing replacements—in the rewinding of armature coils—in the laying up of cars for repairs.

High quality bearings are always the most economical, even tho the purchase price may be a trifle higher. Reduced maintenance costs invariably follow their installation. The money they save pays for them many times over in the course of a year.

More Jones "Tiger" Bronze Axle and Armature Bearings are high quality bearings. Every day they are helping reduce operating and maintenance costs on the country's leading electric railways.

It will pay you to investigate the money saving possibilities of "Tiger" Bronze. Our engineering department will furnish complete data on request.

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Trolley Wheels: V-K Oilless, M-J Lubricated, V-K Non-Arcing Harps.
Bearings: "Tiger" Bronze Axle & Armature Bearings.
Armature Babbitt and similar products.

Write today

MORE-JONES BRASS AND METAL CO.
St. Louis, Missouri

TIGER BRONZE AXLE and ARMATURE BEARINGS

"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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The Quiet Quick-Service Car

NUTTALL Helical Gears can make the operation of Quick-Service Rolling stock very satisfactory.

The effective, yet silent and vibrationless nature of Helical Gears in service are in keeping with the high degree of service demanded from Quick-Service Car operation.

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Pittsburgh, Pa.

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A PROVEN SUCCESS



MASSEY

HOLLOW REINFORCED CONCRETE

POLES

have all the strength of steel poles combined with the permanence, rigidity and lack of maintenance expense which characterize reinforced concrete.

They are not subject to electrolysis or corrosion; will not require painting or become unsightly; and are readily adaptable to all forms of trolley supports.

The Massey special centrifugal processes of manufacture insures a denser concrete than other processes may attain, and an absolute *certainty* of position of the reinforcement—while their hollow construction insures lightness and ease of handling.

The poles may be constructed of any length or taper—and the standards include trolley poles, lighting poles, and an economical combination of the two.



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Steel Gear Blank

There are Gear Blanks

and gear blanks—some good—some bad—some indifferent—gear blanks that may or may not give good service, perhaps there will be a breakdown on that rush order—and then an expensive delay while a new gear is installed.

But there are

Carnegie Steel Gear Blanks

When your gears are cut from these blanks you can rely on them—uniform in quality and guaranteed to outwear cast steel gears three or four times—gears of quality and gears for service.

It pays to have that assurance—that feeling that you can forget all about your gears—that knowledge that they are quietly and efficiently performing their work in regular and rushed production. Leading gear cutters carry them in stock.

Just Specify Carnegie Blanks

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General Offices: Carnegie Bldg., Pittsburgh, Pa.

Finished Gear



1373



NACHOD
Crossing Bells
on the Terre Haute, Indianapolis & Eastern Traction Co.

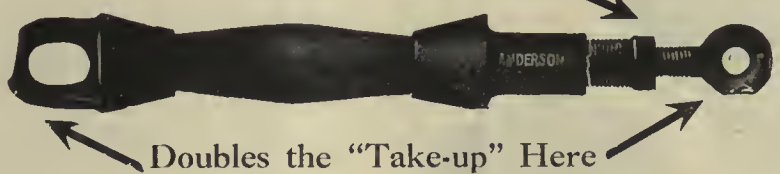
The flashing red lights and loud ringing bell of Nachod Crossing signals are familiar danger signs along this road. They will perform their mission as guardians of safety to all highway traffic.

Why not safe-guard your crossings?
Information on request.

NACHOD SIGNAL CO., INC.
Louisville, Ky.

"One Good Turn Deserves Another"—
with
ANDERSON Double Take-up Wood Strain Insulators

One Turn Here



Doubles the "Take-up" Here

The time and labor is halved. The slack adjusted in half the time and no twisted guy wires. The great tensile strength, perfect adjustment, and good insulation make it a perfect strain insulator.

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NILES CRANES

For Yard or Shop

Dependability, efficiency, versatility and safety are the characteristics of Niles Electric Traveling Cranes. Their extensive installation in car shops throughout the country proves this claim. We also build Trolley Cranes and Hoists, Hand Cranes, Gantry Cranes, Wall Cranes and Grab Bucket Cranes.

There is a suitable unit for Niles conveying and lifting machinery that will just fit the requirements of your shops. Get the advice of our engineers in solving your problems.

We also specialize in machine tool equipment for the railway field. This includes wheel lathes, wheel presses, tire mills, axle lathes, etc., in several sizes.

There is a crane circular at one of these offices waiting for you:



Boston, Philadelphia, Birmingham, Rochester, Pittsburgh, Cincinnati, Cleveland, Detroit, Chicago, St. Louis, Seattle, San Francisco, Los Angeles.

50RL

NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

K-10 fingers with tip unlocked



All you scrap when tips are worn out on both sides

Never Make a Big Repair When a Little One Will Do

You would think it the height of folly to scrap a controller because a finger had worn out, wouldn't you?

Then why scrap a controller finger simply because the tip has worn out? The principle is the same.

Triggerlock fingers are designed to eliminate just that waste of material, money, and shop time necessary for the installation of new fingers.

The finger lasts indefinitely, and with a stock of interchangeable renewal tips, it becomes almost a permanent part of the controller.

There is a triggerlock finger for every type of controller. Yours is among them.

Write for catalogue, or put in a requisition now.

Russell Manufacturing Co.

814 Bath Ave. Niagara Falls, N. Y.

557 King St. West Toronto, Canada.

OPEN THE WINDOWS!

Edwards' Compression Brake Device Will Keep Them From Falling



Windows on cars have a habit of smashing down when least expected. Usually to the detriment of the Electric Railway, directly or indirectly.

Edwards' Compression Brake Device prevents this condition.

In raising the sash the sliding shoe compresses the weaker spring; allowing it to be raised easily and without rattling. In lowering the sash the shoe compresses the heavier spring thus retarding the downward movement of the window.

This device will lower your maintenance costs and prevent damage claims.

Edwards window fixtures are standard on Birney One-Man Safety Cars

O. M. EDWARDS CO., INC., SYRACUSE, N. Y.

Manufacturers of:

Window Fixtures Sash Balances	Top, Bottom and Side Weather Stripping	Metal Extension Platform Trap Doors	Metal Stop Casings Railway Devices



Trolley Wheels *vs.* Trolley Wheel Service

Service, with low maintenance as a by-product, should be the assurance given with every trolley wheel.

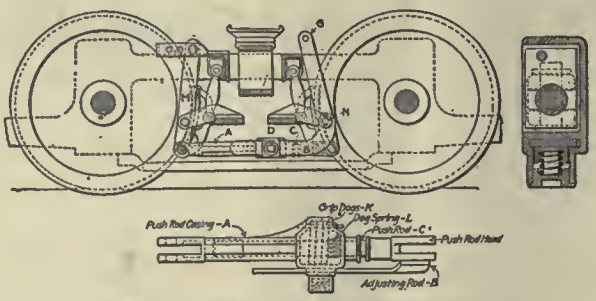
Eureka Trolley Wheels give Trolley Wheel Service because they are made of new, tough, durable bronze, and bored and turned on machines designed for trolley wheels alone.

The result is a perfectly balanced wheel, giving greatest possible mileage with least wear.

Bulletins on Eureka Controller Parts, Commutators Brushholders, Trolley Wheels and Line Material gladly sent on request

THE EUREKA CO. NORTH EAST, PA.

GOULD SLACK ADJUSTERS



DETAILS OF THE GOULD TYPE SLACK ADJUSTER AS APPLIED TO AN ELECTRIC CAR TRUCK

Assure Safety at All Times in Braking

A predetermined piston travel is always maintained. The motorman is assured the same braking power at all times.

Economy is another feature which should not be overlooked. All manual adjustment of brakes is done away with, less power consumed in car operation and a great saving in the wear and tear of the complete car equipment is effected.

Gould Slack Adjusters pay for themselves in a very short time.

GOULD COUPLER COMPANY

30 East 42nd Street, New York ***Works: Depew, N. Y.*** **Rookery Bldg., Chicago**



U. S. G. Brushes

meet every service condition. We offer a number of grades for both slotted and unslotted commutators, all of which are self-lubricating and give good quiet running with exceptionally light wear on the commutator. A wide range of density and electrical resistance to meet all conditions.

Let us figure on your requirements

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Largest Miners of Graphite on This Continent

Railway Roller Bearings



Increase Schedule Speeds—

Decrease Maintenance Costs



The advent of the safety car demands bearings that will speed up schedules and use less power.

In Rollway Bearings we have reduced friction to a minimum, taken up the end thrust by a specially designed roller bearing assembled on the thrust nut, and inclosed the whole bearing in a dustproof, oil tight cover.

These bearings are readily assembled on any make or size motor and will satisfy all service demands.

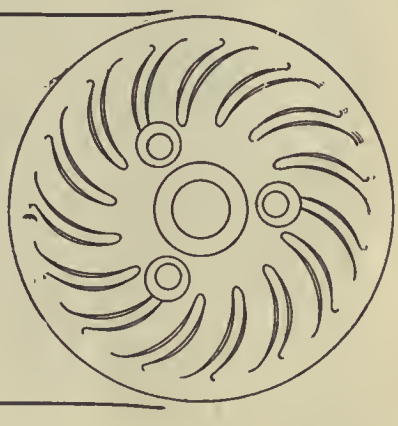
The Railway Roller Bearing Co.

Syracuse, N. Y.



Griffin Wheel Company

McCormick Building,
Chicago, Ill.



GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitting wheels to axles.

FOUNDRIES:

Chicago Detroit Boston St. Paul Tacoma
Denver Kansas City Los Angeles

SAFETY



Safety—the demand of all passengers—is a reality if those Safety Cars of yours have Bayonet Equipment.

No more patching or hurried repairs on the road.

Why?—Well—

A Bayonet Harp or Wheel can be changed in 10 seconds. A trolley Pole fitted with Bayonet Detachable Pole Clamp can be changed in 1 minute. All this is done without tools—all you require is a pair of hands. Repairs are made at the work bench.

The Safety Car is the criterion of Safety. Bayonet equipment is the Criterion of Safety equipment.

BAYONET TROLLEY HARP CO.
Springfield, Ohio, U. S. A.

Some One Wants To Buy

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it

before depreciation scraps it.

The Searchlight Section is helping others—
Let it help you also

0057

It's Not The Build, It's The Builder

An' that's the truth.

Most all Safeties look alike. But those from the Quality Shops soon prove they're likeable.

We're specialists see, that's the answer.

Like wine, we improve with age and were "old hands" at the Safety Car game.

St. Louis Car Company

St. Louis, Mo.

Brake Shoes
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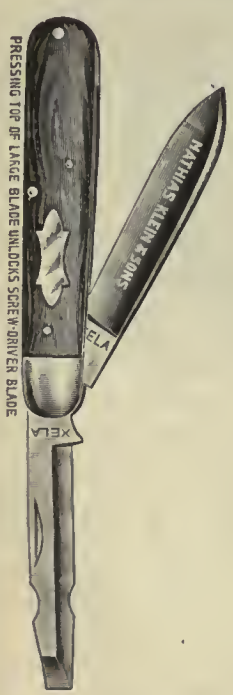
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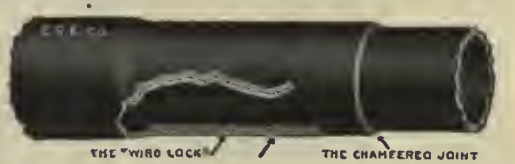
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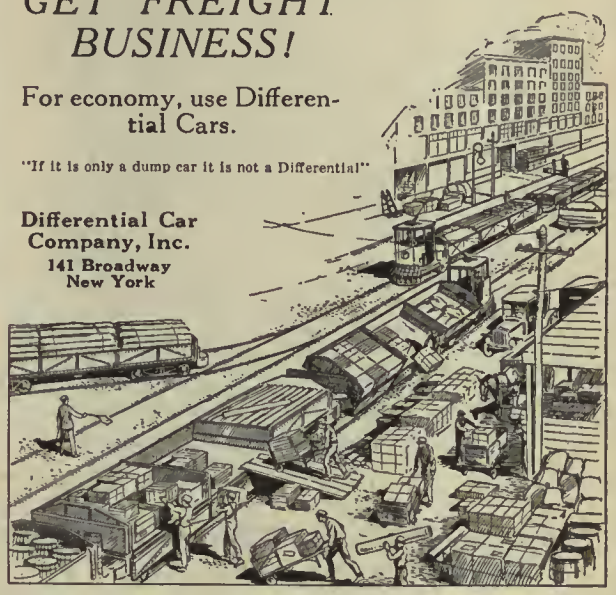
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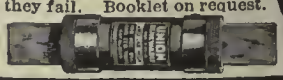


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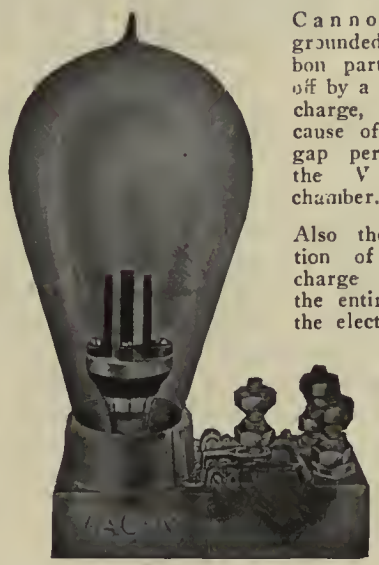
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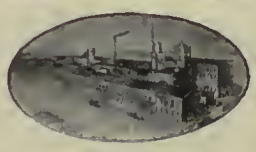
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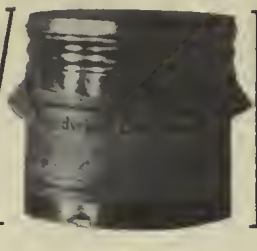
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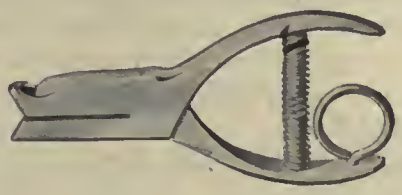
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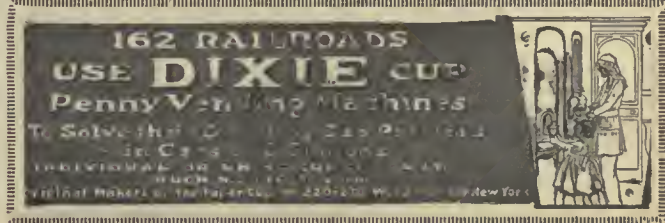
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Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
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Promote Braking Safety

That means that they work practically 100% efficient. That is as near perfect as any mechanical device can be made. When your cars are equipped with Smith-Ward Adjusters there are no "ifs" about their operation. They are "safe" all the time. Hundreds of cars equipped with our adjusters now in daily operation are proofs of that statement.

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Bush Terminal Bldg. No. 1
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Applied to front windows will positively shed water and prevent condensation.

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Apply with rag—then polish

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For fifty years we have served American Railways in the supply of durable and dependable sundries such as buttons, badges, punches, etc. You can feel sure that their quality today is of the same high standard as always.

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—saved $200
buying from an Indiana dealer in
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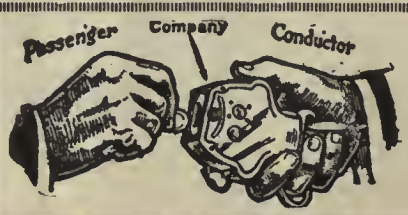
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Carbon Brushes are uniform. They talk for themselves.

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"Zero" for Axle and Journal Bearings AND "Motor" for Armature Bearings

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The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO.
PHILADELPHIA

POSITIONS VACANT

COMPETENT master mechanic wanted for City property in Middle West. P-702, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West. State experience, references, and salary desired when replying. P-605, Elec Ry. Journal, Old Colony Bldg., Chicago.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

FIRST class street car mechanic wanted, one experienced with mechanical and electrical equipment of street cars. Address Corpus Christi Railway & Light Company, Corpus Christi, Texas.

FOREMAN for carhouse 10 to 12 cars in regular service, G. S. equipment, Westinghouse air. Give age, reference and salary expected. P-698, Elec. Ry. Journal.

FOREMAN wanted for armature room. Must be familiar with railway equipment, understand handling men and be able to systematize and install modern equipment in good sized armature winding department. Good opportunity for the right man. Apply stating past experience, salary expected and reason for leaving present position. P-700, Elec. Ry. Journal, Old Colony Bldg., Chicago.

MASTER mechanic, 17 years' experience in all departments, city and interurban, M. K and H. L. control; can handle labor and show results; A-1 reference furnished. PW-690, Elec. Ry. Journ., Leader-News Bldg., Cleveland.

For Sale
G.E. 216 and W. H. 310, 2nd hand
GEARS AND PINIONS
first-class condition.
Write for prices and details.
East St. Louis & Suburban Ry. Co.
East St. Louis, Ill.
c/o Purchasing Agent

POSITIONS VACANT

MASTER mechanic to take charge of the maintenance of car equipment for New England street railway consisting of about 106 miles track and operating about 80 cars daily. Salary $3000. Applicant must have had similar work and responsibilities. Give full particulars as to experience, references, age, nationality, etc. Replies treated as strictly confidential. P-701, Elec. Ry. Journal.

MOTOR instructor, thoroughly competent to instruct motormen in the proper use of air and electric equipment in an eastern city. P-699, Elec. Ry. Journal.

PERMANENT position for an experienced track Supervisor on one of the large trolley systems in the East. Must be capable of handling 18 to 20 track, bonding, welding and paving gangs. Only men thoroughly familiar with trolley track construction and maintenance will be considered. State age, giving experience in detail, salary expected and references. P-682, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

TIME table maker assistant, able, ambitious, experienced. State qualifications, experience and salary expected. Chicago Surface Lines, 804 Borland Bldg., Chicago.

POSITIONS WANTED

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CLAIM agent 40 years old, active and full of life, long experience, desires to make change; expert shorthand writer, obtaining most thorough information investigating accidents, from both injured and witnesses; motormen and conductors most carefully instructed; fine record on low settlements; take own photos of accidents; thorough and up-to-date office system installed; excellent references. PW-694, Elec. Ry. Journal.

ENGINEER, technical graduate, 12 years' experience electric railway track, construction and maintenance, transmission line design and construction, valuation, public utilities. Desires permanent responsible position. PW-704, Elec. Ry. Journal, Old Colony Bldg., Chicago.

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MAN, age 35, 16 years' experience in transportation departments as platform employee, inspector, instructor, dispatcher and assistant superintendent. Good schedule man. At present employed on property operating 90 cars. Will accept position offering advancement. PW-703, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

PUBLICITY director, now employed by one of largest traction interests in the South, seeks similar position in North, East or West to escape Southern climate. Thoroughly familiar with public relations problems and competent to intelligently handle campaigns for readjustments to meet new conditions confronting street railway operation. Highest references from present employers. Address PW-697, Elec. Ry. Journal, New York.

SUPERINTENDENT, 17 years' experience in transportation, traffic and mechanical, on road operating in eastern Ohio. A-1 references, executive ability, competent to assume full charge; can get results. Address PW-639, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT. Fully qualified in all departments; many years' experience in single track, high-apeed, and city operation. Succesaful in handling labor and maintaining discipline. Now employed but desirous of bettering prospecta. Requests the attention of presidents or managers having vacancies or contemplating changes. Excellent references from past and present employers. PW-638, Elec. Ry. Journal.

THOROUGHLY competent operating executive, now manager of small property, desires an opportunity to assume greater responsibilities, with better prospects for the future. Fully qualified in all departments. Most excellent references from present and past employers. Correspondence solicited. PW-637, Elec. Ry. Journal.

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New			Relay		
2000	tons	100's	350	tons	100's
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430	tons	80's	1200	tons	70's
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240	tons	70's	1500	tons	60's
85	tons	65's	4000	tons	56's
500	tons	60's	1100	tons	50's
100	tons	40's	200	tons	45's
20	tons	30's	2000	tons	40's
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330	tons	20's	430	tons	30's
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120	tons	12's	340	tons	20's
17	tons	8's			

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They will be gone soon. Write or wire for our quotations.
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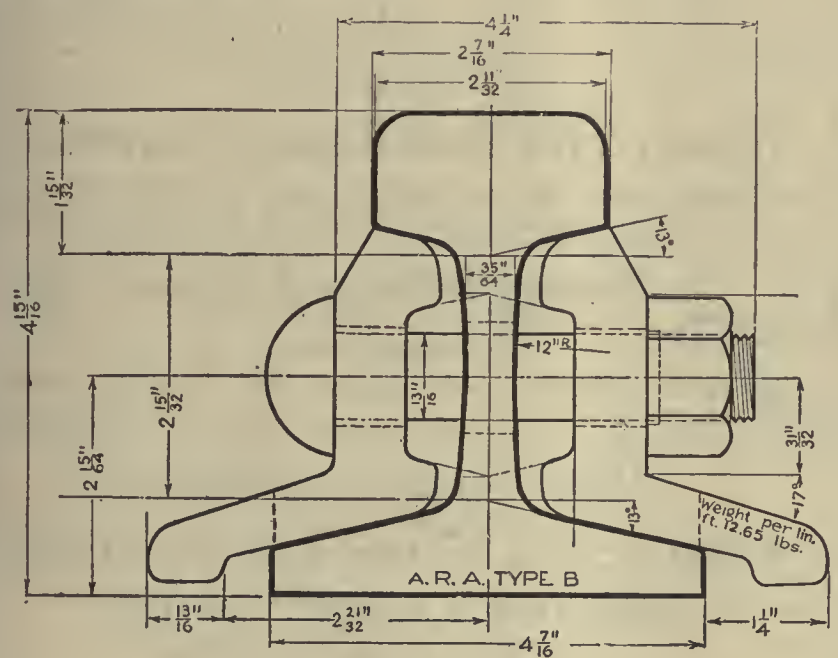
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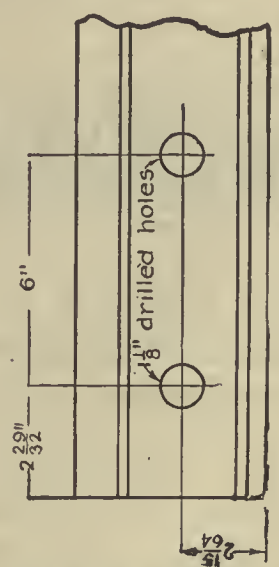
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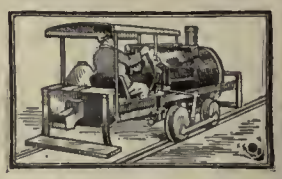
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Twenty-Five Cycle Rotary Converters
2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380-volts.
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Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Track Specialties Co.
Westinghouse Elec. & Mfg. Co.

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Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

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St. Louis Car Co.

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Columbia M. W. & M. I. Co.

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Bearings, Roller & Ball
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Boiler Cleaning Compounds

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American Steel & Wire Co.
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Carbon Brushes. (See Brushes, Carbon

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Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal and Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.
Green Eng. Co.
Portable Machinery Co.

Cooling Systems
Spray Engineering Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Gould Coupler Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Cross Arms. (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing)

Crossings, Frog & Switch
Wharton, Jr., & Co., Wm.

Crossings, Track. (See Track, Special Work)

Culverts
Armco Iron Culvert & Flume Mfrs. Assn.
Canton Culvert & Silo Co.

Culvert Pipe, Concrete
Massey Concrete Products Corp.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Edwards Co., The O. M.
Electric Service Supplies Co.
Pantasote Co.
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg. Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices. (See also Track Work)
Cleveland Frog & Crossing Co.
Wharton, Jr. & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
Edwards & Co., The O. M.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., Inc., H. M.
C-J-H. Service Corp.
Clark Management Corp., E. W.
Drum & Co., A. L.
Engel & Hevenor
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter.
Jacobs & Co., J. L.
Kelley-Cooke & Co.
Republic Engineers, Inc.
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Engineering Corp., The J.G.



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Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits. Instruments designed expressly for testing and laboratory use, for motor-car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

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It may be used on A. C. circuits of any commercial frequency and has a large overload capacity. Other characteristics are: low moment of inertia; effective damping and shielding; and the legibility and remarkable uniformity of the hand-calibrated scale.

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For those who require better insulation than the ordinary cotton and silk covering affords. This new Enamel wire will give the desired results.

When used with cotton and silk covering it gives a much increased insulation value.

When used without cotton or silk covering it takes up much less space and has good insulation value.

Will not crack when bent and will not get brittle when subjected to high temperatures.

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During the rush hours when your motors are greatly overloaded and become excessively hot you need not have any fear of burnouts if the coils are insulated with Salamander Pure Asbestos. It will not burn no matter how hot it gets.

Send us your burnout coils and let us rewind them for you. We are in a position to rush work, thereby helping you out of your difficulties.

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FACTORIES: York, Pa., and Weehawken, N. J.

WHAT AND WHERE TO BUY

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.

Extension Platform Trap Doors
Edwards Co., The O. M.

Fare Boxes
Brill Co., The J. G.
Cleveland Fare Box Co.
Johnson Fare Box Co.
National Railway Appliance Co.

Feed Water Heaters
Schutte & Koerting Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works

Fibre and Fibre Tubing
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus
Castle, Inc., James M.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.

Flooring, Grating
Irving Iron Works

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track. (See Track Work)

Funnel Castings
Wharton, Jr., Inc., & Co., Wm.

Furniture, Metal Office
Edwards Co., The O. M.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Multiple Electric Products Corp.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Fuse, Removers
Bush Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs)

Grates, Chain
Green Eng. Co.

Greases. (See Lubricants)

Grinders and Grinding Supplies
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Keyes Products Co.
Pantasote Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Hose
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Houses, Watchman
Massey Concrete Products Corp.

Hydraulic Machinery
Niles-Bement-Pond Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab'e

Instruments, Measuring, Testing and Recording
Economy Electric Devices Co.
General Electric Co.
Roller-Smith Co.
Thompson-Levering Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instrument Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & Mfg. Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Insulations (See also Paints & Varnishes)
Okonite Co.

Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Templeton, Kenly Co., Ltd.

Joints, Rail
Carnegie Steel Co.
Rail Joint Co., The
Reading Specialties Co.
Track Specialties Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
Railway Roller Bearing Co.

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
National Electric Specialty Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr., & Co., Wm.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Magnet Wire
Belden Mfg. Co.

Machinery, Insulating
American Insulating Machine Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters, Car, Watt-Hour
Economy Electric Devices

Meters. (See Instruments)
Electric Service Supplies Co.

Mica
Mica Insulator Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molded Insulations and Parts
Belden Mfg. Co.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Ohmmeters
Weston Elec'l Instrument Co.

Oils. (See Lubricants)

Oil Burning Equipment
Schutte & Koerting Co.

Packing
Post & Co., Inc., E. L.
Westinghouse Elec. & Mfg. Co.

Paints & Varnishes (Preservative)
St. Louis Surfacer & Paint Co.

Paints and Varnishes (Insulating)
Mitchell-Rand Mfg. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Material
American Brake Shoe & Fdry. Co.

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers. (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Pneumatic Tools
Ingersoll-Rand Co.

Poles, Posts and Piling (Concrete)
Massey Concrete Products Corp.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co.

Power Saving Devices
Arthur Power-Saving Recorder Co.
Economy Electric Devices Co.
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Pumps
Schutte & Koerting Co.

Punches, Ticket
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
Foster Co., L. B.
Lackawanna Steel Co.

Rail Grinders. (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Rail Welding. (See Brazing and Welding Processes)
Rail Welding and Bonding Co.

Rails, Relaying
Foster Co., L. B.
Zelnicker, Walter A., Supply Co., Inc.

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Recorders, Power Saving
Arthur Power-Saving Recorder Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.
Carnegie Steel Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp and Wire Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialty Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley)

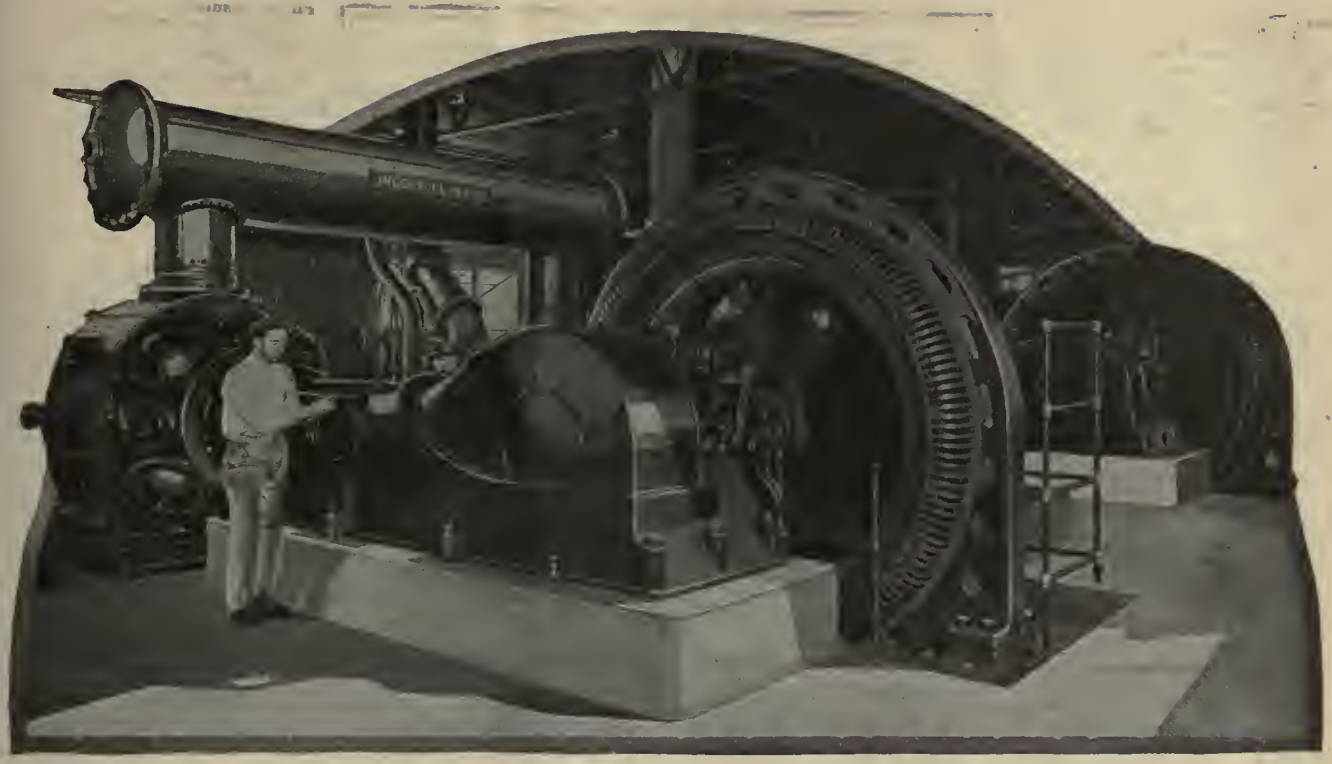
Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Rivet Heaters
American Car & Foundry Co.

Roofing, Car
Keyes Products Co.
Pantasote Co.

Rubber Covered Wire and Cables
Belden Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co.



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There is such a thing as justifiable pride in machinery. The designing engineer can well be proud of the results of his dreams, the mechanic of his exact and careful workmanship, and the salesman of his efforts. But the greatest pride is that of the manufacturer who places machinery in the shop of the man who is proud to own it.

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Offices Everywhere.

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Ingersoll-Rand

WHAT AND WHERE TO BUY

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track. (See Cleaners and Scrapers, Track)

Seating Materials (See also Rattan)
Pantasote Co.

Seats, Car. (See also Rattan)
Brill Co., The J. G.
St. Louis Car Co.

Second-Hand Equipment
Archer & Baldwin
Cleveland Armature Works
Foster Co., L. B.
Hyman Michaels Co.
Zeinicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters. (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Soldering and Brazing Apparatus. (See Welding Processes and Apparatus)

Solderless Connectors
Frankel Connector Co.

Spikes
American Steel & Wire Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves. (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Mason Safety Tread Co.
Irving Iron Works
Universal Safety Tread Co.

Steps, Ladder and Stair (non-slipping)
Irving Iron Works

Steps, Safety
Irving Iron Works

Stokers, Mechanical
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries. (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Subway Grating
Irving Iron Works

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)

Switch Stands
Indianapolis Switch & Frog Co.
Ramapo Iron Works

Switches, Track. (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.

Switches and Switchboards
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Synchroscopes
Weston Elec'l Instrument Co.

Systems, Powdered Coal
Quigley Furnace Specialties Co.

Tampers, Tie
Ingersoll-Rand Co.

Tanks, Ash and Coal Storage
Green Engineering Co.

Tapes and Cloths. (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Tie Plates
Lackawanna Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross. (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
Williams & Co., J. H.

Tools, Linemen's
Buah Electric Co.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Williams & Co., J. H.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Klein & Sons, Mathias
Railway Track-work Co.

Tower Wagons and Auto Trucks
McCardell & Co., J. R.

Towers and Transmission Structures
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & Mfg. Co.

Track Bolts & Spikes
Lackawanna Steel Co.

Track Expansion Joints
Wharton, Jr., & Co., Wm.

Track, Special Work
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Engel & Hevener
Indianapolis Switch & Frog Co.
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.
Wharton, Jr., & Co., Inc., Wm.

Transfer Tables
Archbold-Brady Co.

Transfers. (See Tickets)

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Treads, Safety, Stair, Car Step
American Mason Safety Tread Co.
Universal Safety Tread Co.

Trolley Bases
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Trolley Bases, Retrieving
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolleys and Trolley Systems
Ford Chain Block Co.

Trolley Shoes
Miller Trolley Shoe Co.

Trolley Wheels. (See Wheels, Trolley)

Trolley Wire
American Steel & Wire Co.
Roebling's Sons Co., John A.

Trucks, Car
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Turbines, Steam
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Elec. & Mfg. Co.

Turnstiles
Perly Mfg. Co., Inc.

Valves
Ohio Brass Co.
Schutte & Koerting Co.
Westinghouse Traction Brake Co.

Varnishes. (See Paints, etc.)
Weston Elecl. Instrument Co.

Vending Machines, Drinking Cup
Individual Drinking Cup Co., Inc.

Ventilators, Car
Brill Co., The J. G.
National Railway Appliance Co.
Railway Utility Co.
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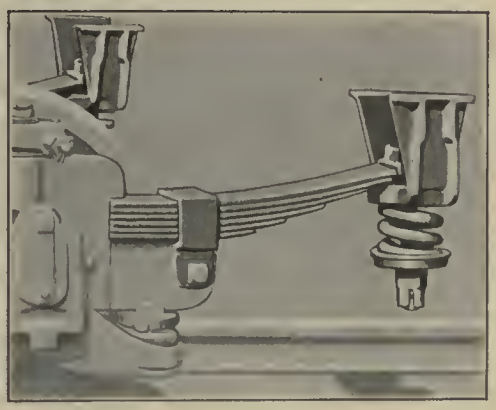
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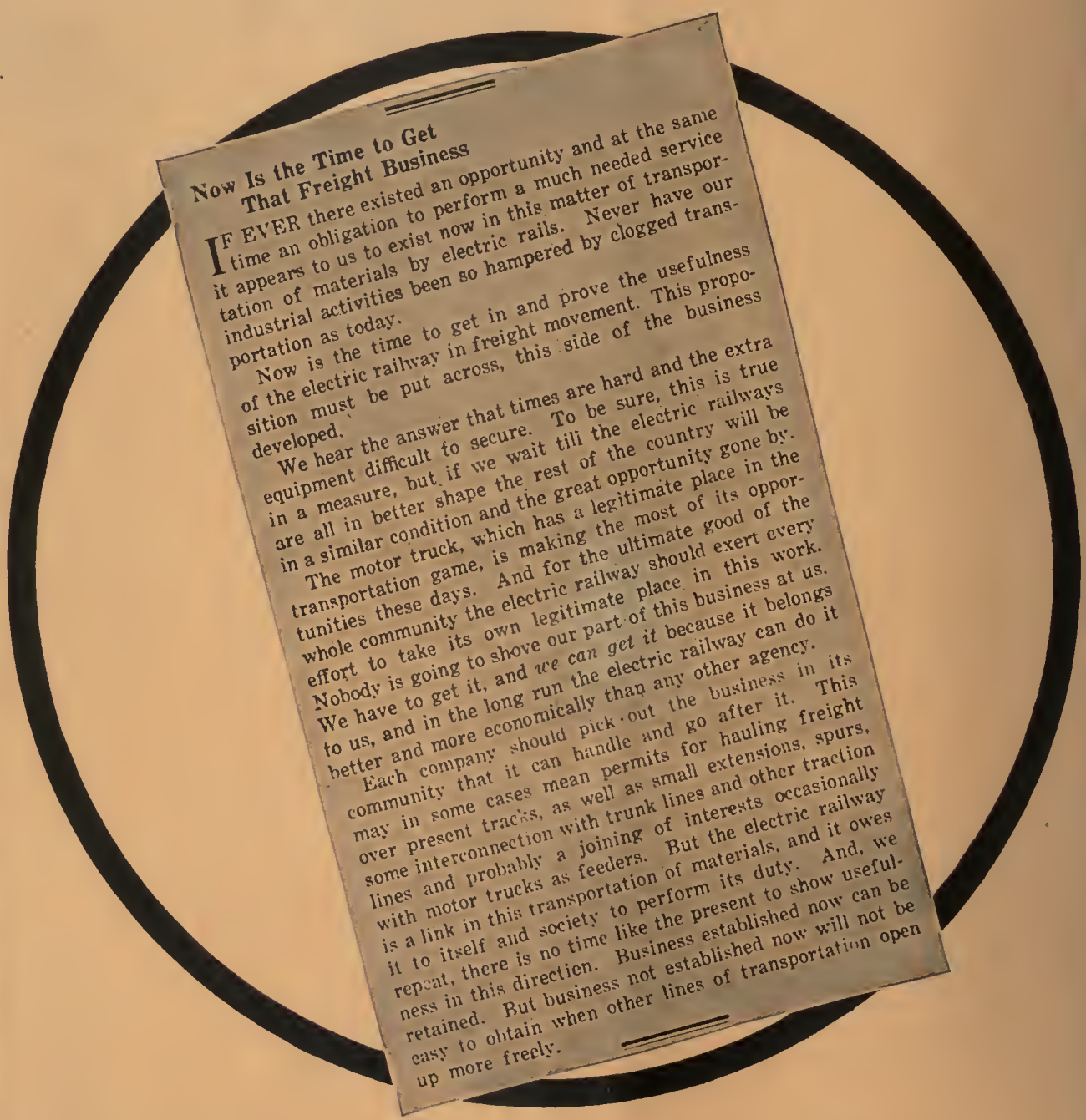
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Now Is the Time to Get That Freight Business

IF EVER there existed an opportunity and at the same time an obligation to perform a much needed service it appears to us to exist now in this matter of transportation of materials by electric rails. Never have our industrial activities been so hampered by clogged transportation as today.

Now is the time to get in and prove the usefulness of the electric railway in freight movement. This proposition must be put across, this side of the business developed.

We hear the answer that times are hard and the extra equipment difficult to secure. To be sure, this is true in a measure, but if we wait till the electric railways are all in better shape the rest of the country will be in a similar condition and the great opportunity gone by.

The motor truck, which has a legitimate place in the transportation game, is making the most of its opportunities these days. And for the ultimate good of the whole community the electric railway should exert every effort to take its own legitimate place in this work.

Nobody is going to shove our part of this business at us. We have to get it, and *we can get it* because it belongs to us, and in the long run the electric railway can do it better and more economically than any other agency.

Each company should pick out the business in its community that it can handle and go after it. This may in some cases mean permits for hauling freight over present tracks, as well as small extensions, spurs, some interconnection with trunk lines and other traction lines and probably a joining of interests occasionally with motor trucks as feeders. But the electric railway is a link in this transportation of materials, and it owes it to itself and society to perform its duty. And, we repeat, there is no time like the present to show usefulness in this direction. Business established now can be retained. But business not established now will not be easy to obtain when other lines of transportation open up more freely.

The Baldwin Locomotive Works
Philadelphia, Pa.

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East Pittsburgh, Pa.

Vol. 56, No. 4 New York, July 24, 1920 *Pages* 159-200

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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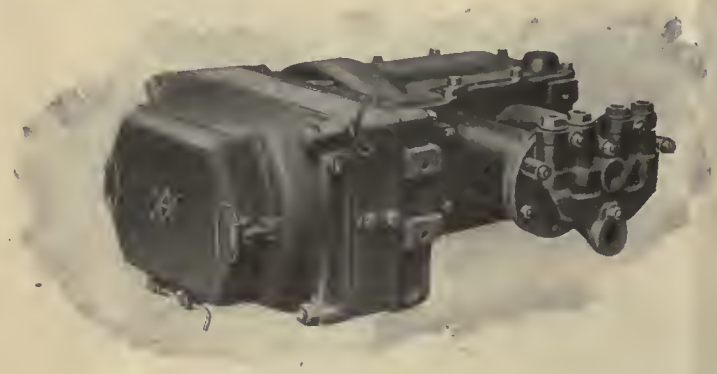
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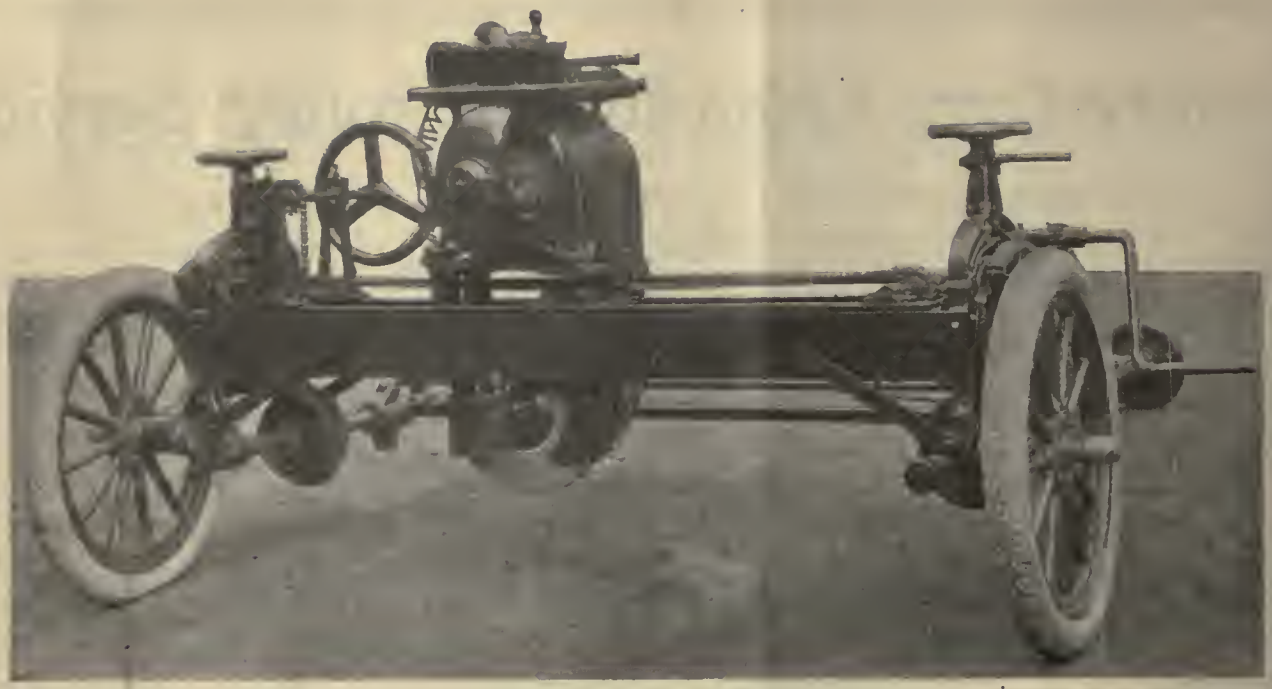
they are equipped with automatic, laborless apparatus, so interlocked that regardless of the illness or distraction of the operator the power will be cut off instantaneously, the airbrakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, they are Safety Cars only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

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[redacted] R. R. Sued Because Of Fire-Hose Cutting

Suit for $12,300 damages was filed in the Superior Court against the [redacted] Railroads yesterday by Grace C. Kearns, owner of a two-story frame dwelling at 3649 Clement St., which, she says, was partly destroyed by fire February 20 because a [redacted] Railroads motorman ran his car over four lines of hose. Before the firemen could repair the hose line, she says, the fire, which was being controlled, sprang up again and severely damaged the house and contents.

—Clipped from a daily paper

WOULD BUY OVER 7 DOZEN O-B HOSE BRIDGES

It is a serious matter when a street car cuts a fire hose.

And it's serious when a fire hose puts a street car line out of service.

The O-B Hose Bridge prevents both of these.

It carries the heaviest interurban over four or six lines of hose with perfect safety to both.

Cars proceed over regular routes on regular schedules.

O-B Bridge knocks down into a compact bundle. Every fire hose truck and emergency truck in your city should carry one.

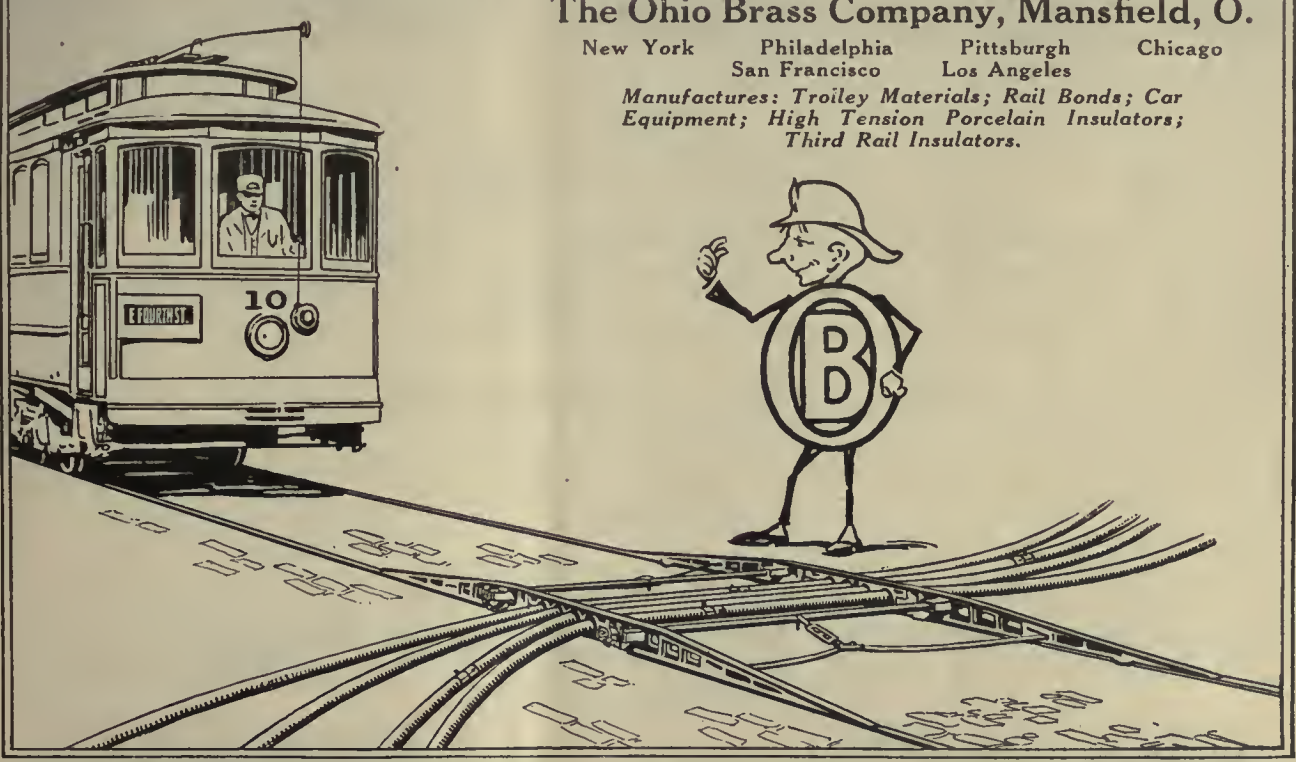
Page 574 Catalog No. 17

Most cities use O-B Hose Bridges and find them indispensable. Fire chiefs approve them.

The Ohio Brass Company, Mansfield, O.

New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles

Manufactures: Trolley Materials; Rail Bonds; Car Equipment; High Tension Porcelain Insulators; Third Rail Insulators.



Phono-Electric

—the only trolley wire on four tracked Canal Street



When a city is busy enough to have a four-track line for more than a mile on its main highway, it is wisdom to build each part of the line as durably and efficiently as possible.

Canal Street, New Orleans, is the most famous thoroughfare of the South, and over every one of its four tracks is that best form of overhead service insurance known as

Phono-Electric Trolley Wire

Operators of electric railways over busy highways can afford to use none other than Phono-Electric. For ability to resist wear, blows and arcing it stands alone.

Bridgeport Brass Company
Bridgeport Connecticut

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Heavier Sections used throughout in

INTERNATIONAL

STEEL CROSSING FOUNDATIONS

THE sections used in building the box girders which, filled with wood, make up STEEL CROSSING FOUNDATIONS have been increased in weight until the box weighs nearly one hundred (100) pounds per foot.

Seven inch by 14¾ pound Channels as side members are riveted together with ¾-in. rivets and ⅜-in. top and $\frac{7}{16}$-in. bottom plates; into the box thus formed creosoted wood blocks are pressed with the grain vertical.

But by fortunate purchases of Government destined steel the prices we are quoting are held to a very attractive figure.

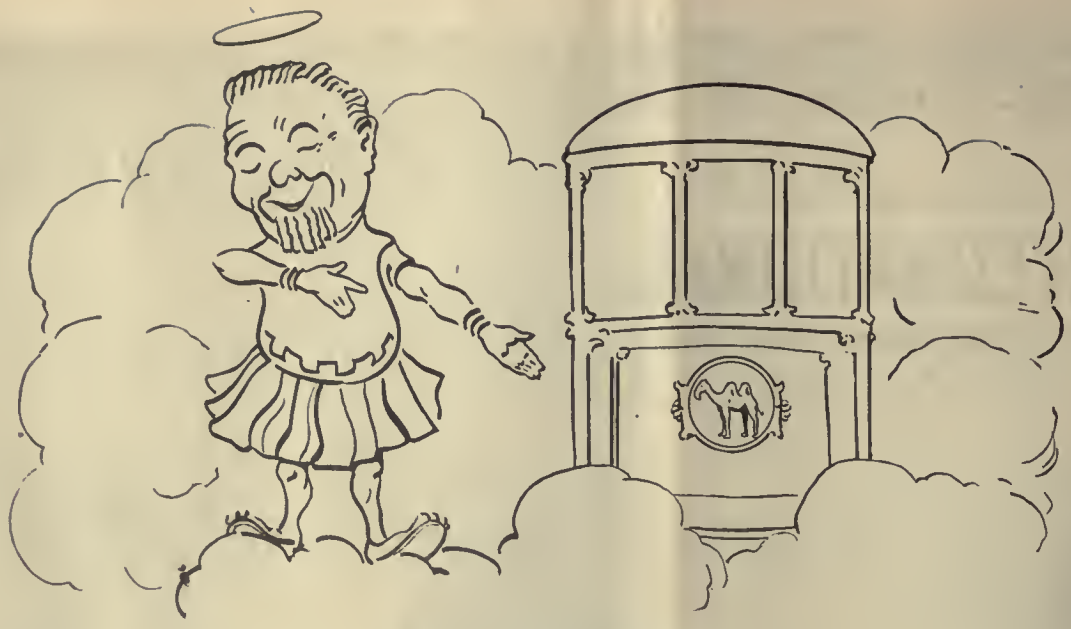
Large re-orders of *International Steel Crossing Foundations* are now being built for Electric Railways.

Let us prepare proposal plans and estimates for your renewals.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



CHAPTER THIRTEEN

THE ALL-*BUT* PERFECT STATE

The Camel as an Emblem of Aridity

One of our serious thinkers on traction matters suggests that the Camel should be used as an emblem for some of our "Holding Company Roads" that have had every straw but the *last* one piled on them—and then these straws allowed to absorb their weight in moisture from the ambient financial atmosphere.

Great consternation is aroused when they drop, for be it known, the last straw was not added.

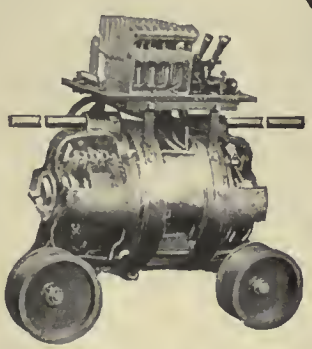
Therefore the camel is not a happy emblem for these roads.

It is however serving its logical purpose as an emblem for the roads in the All-But Perfect State, for there each road will stand on its own feet and pay its own way.

It will be formed to meet an existing need—and the people who form this need will see to it that they are served without loss.

They will be just as much a part of the road as a Dynamotor-welded bond is part of the rail.

—once there—always there.



READING NUMBER THIRTEEN

Q. What is there about the Dynamotor that makes a better bonding job than by other means?

A. For welding and for bonding there is a specially worked-out process of which the Dynamotor is part. It's too long a story for this small space—so we have it in leaflet form just awaiting your request.

Rail Welding and Bonding Company

Formerly The Lincoln Bonding Co.



Cleveland, Ohio.

A Comfortable Seat and a Contented Man





Keystone Seats make it easier and less strenuous for the motormen.

Keystone motorman's seats are collapsible—with one kick the supporting rod collapses and the seat is entirely out of the way.

They are strong and adjustable.

They will make your men happier, more contented and better workers.

Write for data sheets.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

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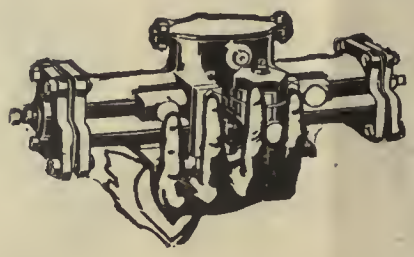
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What do your passenger

Standardize!



It's not your car-mile figures per diem, per week or per month; but your car-mile figures by hours and routes that will show why your present or future large cars should be Pneumatized.

These hour-by-hour figures will prove to you not only that you need two kinds of rolling stock, but also what proportion of each kind.

For example, your average passengers per car-mile throughout the day as a whole may be six or seven.

Yet the actual density of traffic may vary from two to five passengers for fifteen hours a day, while rising to twelve passengers per car-mile or more during five or six hours of the day.

Make your peak periods produc

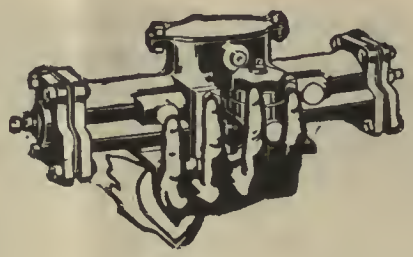
National Pneumatic Company, Inc.

50 Church Street, New York Edison Bldg., Chicago

Works: Rahway, N. J.

per-car-mile figures show?

Pneumatize!



If yours is that kind of an electric railway—and most railways are that kind—you can operate efficiently only by using equipment and methods suitable for such opposite conditions.

For the all-day base service you will standardize on the safety car with the *National Pneumatic* Door Engine incorporated as part of the famous safety combination of the Safety Car Devices Company.

But to supplement the safety car service in the heaviest hours, you will standardize on the "Rushour" line for big cars and trains embodying *National Pneumatic* Door Engines, Interlocking Door Control and Door and Step Operating Mechanisms to

maximum profit and efficiency

National Pneumatic Company, Inc.

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ECONOMY

in Track Maintenance By the Use of

Indianapolis Apex Welded Joints on hundreds of electric railways in the United States and Canada and the successful upkeep of shop and car equipment with the Indianapolis Portable Patented Electric Welder has won for this equipment the reputation of being the Greatest Aid of the Way Engineer.



"Apex" Joint for Guard and Girder Rail

Credential

8 years of continuous growth
Additional Roads adopting each year
***Increased* number sold *each* year**

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Other INDIANAPOLIS PRODUCTS are—

Fluxated Welding Steel
which makes welds better and last longer.

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Get our prices on "All-Manganese" Crossings and Turnouts

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ACKLEY BRAKES
Found The World Over

LISTEN!

Pressed Steel Pedestal
Electric Steel Gears
Double Eccentric Winding Drum
Automatic Check Chain System
No Sprockets—No Chain Cutting

You are not experimenting when you install the



Ackley No-Staff

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Manufactured under **Basic** Patents

For either heavy or safety cars



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ACKLEY 2 E BRAKE

Passengers carried vs gross revenue

It isn't the number of passengers carried but the number of fares collected and registered that determines gross revenue.

Public service commissions are now examining carefully into details of railway operation—one of the most important being whether or not the company applying for increased fares is taking full advantage of available economies. One of these available economies is the Johnson Registering Fare Box. Therefore, it behooves the manager to study these conditions seriously for himself.

"The recovery of one 5 cent fare, heretofore missed, means a net profit of 5 cents, free from all operating charges."

This statement should set every railway man thinking.

Is it possible that there is a serious leak in your business? If other companies have added from 3 to 10 per cent. to their receipts by the use of registering fare boxes, isn't there the same possibility for your property?

Write to companies using such boxes and find out. Then write to us and let us help you.

JOHNSON FARE BOX COMPANY

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Along the Road of Progress
50 Years of Galena Service



Back in 1869 Galena Service first came on the market. It was then a marked improvement over all others. Horse cars were then in vogue and Electric Cars were unheard of. Just see what progress has been made in that short stretch of 50 years.

Rapid strides have been made in all lines but not too rapid for the Galena Service. As new devices and new inventions were made it meant the improving of Galena Service to compare with conditions. Not only has it met each condition that has arisen but has kept a step or two in advance.

Today as in 1869 Galena Service is an established fact and when real service is demanded Electric Railways always know where to turn. So well is our policy established and so fair have we been with our prices that the majority of the Electric Railways have adopted the Galena Service as a standard.

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Durability is not alone a matter of quality of materials—details of construction have an even greater effect upon the life of a product.



The G-E Form H Hanger is designed to give maximum strength

When selecting a hanger for use in the overhead it pays to look closely into the inside construction.

Form H Hangers are built for long life—note the shape of the metal shell as shown in the cross section drawing above. The strain of supporting the trolley wire does not fall on unsupported moulded insulation; sturdy metal projections on the inside of the shell reinforce the compound making the strain one of compression — the bolt cannot pull out in service.

Note also the metal ear seat and ample creepage surface, other superior points of this hanger. The form H, as all other G-E line material, is sherardized by the G-E electric oven process giving positive protection against weathering.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 56 New York, Saturday, July 24, 1920 *Number* 4

Lest We Forget, Let's Do It Now

NOW is the time to underline the dates Oct. 11 to 15 and to order reservations at Atlantic City. That resort is very popular and its hotels are always crowded. Hence, to avoid trouble and delay, those who intend to go to the convention should make their reservations with the hotels immediately.

Every indication points to a banner convention. There is a get-together spirit manifested this year that is very encouraging. All the committees of the association have been working hard and valuable material is certain to be presented at the meetings. Our "Daily" will be on hand as usual for the benefit of those in attendance.

Car Reconsignments Aid Coal Speculators

EVIDENCE submitted to the various committees investigating the coal situation shows that a very vital element in the situation is introduced by the speculations of coal operators and dealers through the manipulation of markets by reconsignments of coal cars.

With no reserve stocks on hand the demand for coal is so great that, even though production is almost normal, the transportation facilities are taxed to their utmost, yet evidence tends to show that speculators in the New York and Chicago districts have been keeping "tight" markets by locally reconsigning cars and barges in order to aggravate the shortage and realize large profits. While no direct action has been taken, the Interstate Commerce Commission is on record as to the desirability of the railroads prohibiting reconsignments and increasing demurrage rates.

It seems to us, in view of the coal shortage, car shortage and threatened railroad strike, that an immediate order forbidding the speculative reconsignment of cars would aid greatly in relieving the situation. The fact that coal stocks are low should not offer opportunity for profiteering in a national necessity.

The Industry Has No Disease Which a Reasonable Fare Will Not Cure

SOME curious aberrations appear in the public mind because of the demand for higher fares from the railways. Even such an astute writer as Richard Spillane takes the text of a recent paper by a railway manager as indicating the trolley car is doomed because the manager said that yearly the costs of operation and maintenance of railway operation have gone up, leaving virtually no opportunity for the operating companies to lay aside reserves. But there is no dependable substitute for the trolley car, as the citizens of Toledo and certain cities in Connecticut and eastern Massachusetts can testify, and as people can hardly be expected to walk it is safe to say that the car is not "doomed." It is still the cheapest means for popular transportation in cities, as Mr. Pardee showed in our issue of July 10 and as other competent observers have testified. All that the trolley interests want and ask for is a fair deal and that their increased expenses should be recognized in an increased fare. Statistics show that more people are riding on trolley cars than ever before. The industry is afflicted with no disease which a reasonable fare will not cure.

"Watch Your Step" Can Be Applied at Home

WE RECENTLY said that it is the sore spots in the fare situation rather than the good ones that stand out now, and this fact of itself is a healthy sign. At the same time we warned against undue optimism and decreased effort and urged those who healed the sore spots in the railway industry to be sure that they were well healed.

Now a word can well be said to those companies which at present are enjoying higher fares as the result of a realization of the facts by the public, and that is "to keep faith." We were just about to pen these words when there came to our attention a like message in a daily journal whose past record shows that it is in sympathy with the electric railways as well as conversant with the problems of the industry. It is therefore friendly, not critical, comment.

In commenting on the Bridgeport jitney situation the New Haven (Conn.) *Journal-Courier* of July 15, 1920, attributes the support given the jitneys by many people as due, at least in part, to resentment caused by remembrance of old faults in electric railway administration. "It has not been easy," the paper says, "for people to forget the arrogant attitude of trolley managements and their cold indifference to public opinion; their confidence in legislative protection rather than in public support." The passage of the Bridgeport ordinance restricting jitneys is attributed to the public's consciousness of the embarrassments which would result from a cessation of trolley service rather than any special tribute to the company. The editorial then tells the public that to nurse a grievance for past errors is useless and both public and trolley company should learn the lesson that in the future there must be a perpetual square deal. The protection now given the railway, it points out, will be worse than no protection unless in return the company maintains high efficiency with lowest possible cost. Finally it says that the company's "future must depend upon the service and the spirit in which it performs it, and not upon explanations and excuses. This we take to be the understanding that is tacitly formulating itself as the result of this struggle. The company is to do its best and the public is to keep an eye on it."

As in previous cases, we do not wish to apply this merely to the company in question, all of whose officers and men have already seen it, but for the benefit of all.

An instance of an act which, though probably merely careless, might well be taken by the public as the opposite of playing fair also came to our attention recently. It was a statement or argument which urged that, irrespective of future changes in price level, the electric railways do all in their power to maintain any increased rates of fare obtained at the present time. At the same instant, and rather incongruously, the speaker argued in favor of the service-at-cost principle, so far as it related to rate increases.

This sort of support is disingenuous and productive only of distrust of our motives on the part of the public. A perpetual square deal is needed, without equivocation.

The Electric Railways Need More and Better Publicity

WHY does the public still misunderstand the electric railway situation? This question is one which many friends of the industry find it hard to answer. During the past few years a great deal of effort has been devoted by railway men and others to explaining the issue, but a great part of the public still does not understand. Many men in responsible and authoritative positions seem bent upon distorting the facts. "I cannot understand," writes one of our readers, "why it is so hard for the railways to secure justice when the situation is so obvious and the future welfare of the communities served is so largely dependent on the fairness of the treatment which they give to their utilities."

The facts are undoubtedly obvious to railway men, but that does not mean that they are equally apparent to their neighbors who are engaged in other lines of work. They are the men to reach. Little is to be gained from publicity directed to men acquainted with the situation. Conventions at which railway men tell each other how bad the situation is do not advance materially the desired public knowledge of the situation, no matter how valuable they may be in other ways.

As we have said many times before, there is nothing mysterious in publicity work or the way of getting the facts to the public, and the message will get across finally if it is a worth-while message and it is pushed. But people are so much interested in their own affairs that they will not pay much attention to the affairs and troubles of other people, unless those who have the message to transmit assume the initiative and take some interest in becoming evangelists.

Through Service Should Be Extended, Not Disintegrated

THE advantage of through service over various connecting interurban properties has been referred to from time to time as a very desirable thing, particularly in connection with the haulage of freight by electric railways. The value of this interchange of freight between electric railways was particularly emphasized during the outlaw strike of the switchmen a few weeks back. In our issue of May 8, 1920, we commented on the extent to which freight had been shipped by way of the electric lines in the central territory and pointed out how the building of one or two surprisingly short pieces of track would greatly facilitate such through shipments. In fact, it may be said that the development of freight business in connection with electric railway lines hinges in an important way on interconnection of lines and interchange between companies. The possibilities of the development of through freight shipments has scarcely been touched.

With these thoughts in mind it is with a good deal of regret that we note that the receiver of the Buffalo & Lake Erie Traction Company has made application for and received permission from the New York Supreme Court to discontinue its lines within New York State after Sept. 1. This company's line runs along Lake Erie from Erie, Pa., to Buffalo, N. Y., and forms the connecting link between the great electric railway network of the Middle West and the lines east of Buffalo. While we fully appreciate that an electric railway property cannot be kept in operation out of sentiment if there is not enough business to justify its existence, yet in view of the possibilities of through freight development in the future it does seem that the electric railway industry should take enough pride in interconnection possibilities and in the future aspects of the freight business to find some way to keep this piece of line in operation. We regret exceedingly to see the abandonment of an important connecting link in the greater electric railway system.

Lessons from and for the Motor Bus

THOSE who have hitherto curtly dismissed the motor bus with a sniff, snort and sneer, based upon their observations of the improvised jitney breed, will find a different kind of animal when they come to the productions of the high-grade manufacturers of motor trucks and, even more perhaps, to the specialized design of the experienced Fifth Avenue Coach Company of New York.

Our overdevelopment of trackage and underdevelopment of paved highways may not yet call for any such extended interoperation of trolley and bus as is the case abroad, but we do not think it is any too early for electric railway operators to begin acquainting themselves with the best practices in the newer form of transportation. For this reason we are presenting in this issue a comprehensive abstract of the paper on "Motor Bus Transportation" by G. A. Green, general manager and engineer Fifth Avenue Coach Company, at the summer meeting of the Society of Automotive Engineers. Discussion of this frank contribution might well be divided into what the electric railway can learn from the motor bus and what it can teach to its junior in the business of transportation.

It is in discussing the possibilities of a gas-propelled car that Mr. Green says bluntly of present trolley cars: "They are as a whole built as strong as possible, not as weak as possible, which is a much more logical and economical procedure." It is true that safety-car development has been a big help toward producing a lighter car, but we still expect car designers to secure automobile weight without using automobile materials. There is also something worth thinking about in Mr. Green's remarks about one-man buses and double-deck buses. We are far from having exhausted the possibilities of the automatic one-man car. On the average interurban, for example, a short-headway service would keep the Ford on the farm a greater part of the time. Nor is it beside the mark for electric railways to consider the use of either trackless electric or gasoline one-man buses for lighter traffic conditions. As for Mr. Green's other extreme, the double-decker, we

feel that if a two-story bus can be built low enough for our viaducts the same thing can and really has been done (at New York and Pittsburgh), with trolley cars. For use in ordinary traffic we have never been enthusiastic for the double-deck car, believing it slow compared with other designs of cars. But with the increases which have been taking place in the wages of the platform man every means, whether safety car, train or double-decker, which promises to increase the output per man must be kept in mind.

The splendid research organization of the Fifth Avenue Coach Company fortunately is an expense from which electric railways are almost entirely free because of the more than generous experimental work of many of our manufacturers. We would pause to add, however, that in such a matter as fuel the electric railway would do well to study the almost meticulous methods of the Fifth Avenue Coach Company. To paraphrase Mr. Green, power is the second largest item of expense. It is to be observed that every step in the use of this company's power, gasoline, is studied so that there shall be no waste in the generating (engine) or use (driving) thereof. How many electric railways are paralleling this company's practice by following up their power from coal pile to controller handle?

What now has the trolley car to teach the motor bus? First, that the flexibility which is of so much value in handling shifting or sudden traffic movements is more harmful than helpful when traffic over an always busy route has to be handled to assure maximum carrying capacity. A large motor bus has about as much chance to cut past or around flocks of automobiles as a lumbering crow has to fly rings around a kingbird. In no case could the bus do so without taking unwarranted chances. A vehicle that must stop and turn to the curb at every corner almost is quite as bad a blockader as any trolley car could be. We wish that certain bus promoters, or rather the "widows and orphans" they seek to beguile, understood this point as clearly as Mr. Green, who says that "No type of bus designed up to the present is capable of properly handling peak loads." We would make an exception to this, however, where it is possible that buses of the sightseeing *char-a-banc* type might be used by electric railways to carry part of the peak loads on express schedules through short cuts away from congested thoroughfares. Service of this kind would not be justified in itself, but would be worth trying if it afforded a substantial relief to congested railway traffic points and was subsidized by a higher fare or in some other way by the people who are especially benefited by the service.

The second lesson for the motor bus is the demonstrated absurdity of a fixed fare. The Fifth Avenue Coach Company, with its 10-cent franchise rate for any distance, is facing trouble in view of ever-rising gasoline and wages as surely as any electric railway which is trying to make ends meet on 5, 6, 7 or even 8-cent fares. Only the combination of unexcellable riding territory, a large volume of business permitting a small margin of profit per bus-mile and experienced management have kept the company's financial head above water. The failure of the Chicago Motor Bus Company, aside from any questions of bus design or operation, indicates that the field for *de luxe* service is highly limited, and in any case such service must have a flexible unit if not a flexible distance fare to be successful. Mayor Hylan of New York, with his notions of a 5-cent universal transfer bus system, might well ponder Mr. Green's statement: "The theory that the car systems in any of the larger systems can be supplanted by any standard type of bus now obtainable is absurd and not worth any serious discussion." So, quoting for the last time, as "The bus is not more economical than the trolley car on the basis of cost per passenger carried, which is the only real basis," we must conclude that the best way to exploit the bus is to use it to supplement rather than supersede the electrically operated car.

Squandering Money Badly Needed for Constructive Purposes

WHAT an absurd position is being taken by the city hall politicians of Chicago, and what a wanton waste of money! The municipality is so hard pressed for funds with which to meet its payrolls and other necessary expenses that at the present time it faces a shortage of several million dollars before the end of the year, with no practical plan in sight to meet the deficit. Nevertheless, the City Council recently approved the expenditure by the Mayor of $421,985 additional to fight the increases in elevated and surface line fares and telephone rates. This is in addition to previous appropriations amounting to $323,858, making a total of $745,843, which may be spent before Jan. 1, 1921.

No reference to this waste of money would be complete without comment on one or two other features of the situation. The Mayor has appointed a special traction commission for the purpose of working out a "people's ownership" plan, which seems doomed to failure from the beginning, although it has a certain vote-getting appeal. The appropriation for this commission is $250,000. The counsel for this commission is also counsel for the Mayor in traction matters before the Public Utilities Commission and receives for his services on each a per diem payment of $150, although, in the opinion of those competent to judge, in all of the hearings in the Chicago fare cases he has never presented a pertinent constructive suggestion. This is not only wasting money but "rubbing it in."

Leaving the financial side for a moment and turning to the absurdity of the fight, one cannot avoid being concerned over the unwarranted attack. When the supreme legislative authority of the State has set up a tribunal such as the Illinois Public Utilities Commission, and provided all the necessary machinery and authority to safeguard the interests of the people in their dealings with the public utilities, it would seem that the decision of such a body would be satisfactory to the public. We believe that to be the case, and that the expenditure by the city hall of Chicago to fight these decisions or for any other similar purpose is unwarranted and a waste of the public's money. This belief is made more apparent in the case of Chicago when it is recalled that the city hall is continuing its fight against the decisions of the commission, despite the fact that the city has repeatedly lost its cases in contention with the Illinois Public Utilities Commission; that the commission has been upheld in every decision fought by the city in every court save one, and that this unfavorable decision was later reversed by a higher court and the lower court rebuked.

Yet this legal brawl goes on and on, utterly without hope of any good save the discreditable appeal that any fight for lower fares makes to the ignorant and unthinking.

This is Number Five of a Series of Articles on Salient Phases of the Electric Railway Situation

Detroit Muddles Along

By Edward Hungerford

MR. HUNGERFORD tells in this issue how the transit situation in Detroit has long been the football of politics. Various solutions of the question, involved through the expiration of some of the franchises of the present company, have been suggested, including service-at-cost and municipal ownership. The latest plan of the city is to own and operate an opposition system, which has many disadvantages from the standpoint of both the taxpayer and car rider.

For at least a quarter of a century now the Detroit traction system has been the making—or the unmaking—of the local politicians. In all that time, beginning with the rule of the late Hazen S. Pingree as Mayor of the Motor City, there has not been a year or a month or a week hardly in which the community has not been torn with doubts and perplexities as to its trolley service. It has been told, and in all probability has believed, that the Detroit United Railway, which is almost the sole purveyor of that service, is not only merely bad but sin-filled; far past the point of any possible redemption. Yet Detroiters who wandered far from their firesides and perhaps into less favored communities have been apt to return home feeling that their street railway service was far and away better than that of many of the cities which they had visited. But their local newspapers quickly informed them of the error of such thinking. Detroit trolley service was bad. It was hopeless. The company itself narrowly escaped being completely criminal. At least so the newspapers said.

Some day some one is going to have the ability and the courage to write of certain public prints as they in turn have written of certain American industries and utilities which have not chanced to be numbered among their large and generous advertisers. It is my personal opinion that such an analysis will be almost certain to show that there are good and bad newspapers, just as there are good and bad trolley companies, as well as other public utilities. The problem will then remain to separate the sheep from the goats in newspapers fairly, just as certain folk have endeavored to separate them in the transportation business, with varying degrees of success. To my own mind, even this last is passing difficult. Seemingly the point might be reached by an exact and accurate comparison of the different traction service in cities of the same general type—their fare charges, the service rendered and the like. As a matter of actual practice, however, such a method would be both inaccurate and unfair, because one might find two American cities of almost exactly the same area and population and still differing widely in their transit necessities because of their topography or conformation or peculiar type of industry or of population, or any one of a dozen other characteristics or the temperaments of the traction operators themselves, which it seems might be allowed a fair degree of human variation.

But none of these things, I think, should permit the city transit ques-



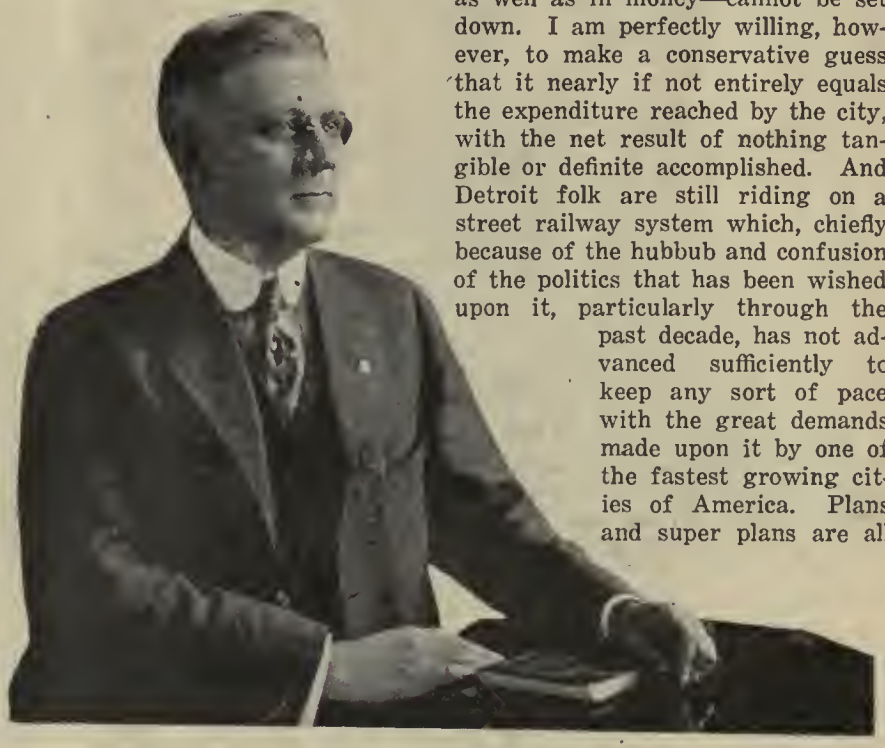
This view was taken at the corner of Monroe Street and Woodward Avenue, in front of the City Hall and at the downtown civic center of Detroit.

tion to be the mere football of politics, as it has so long been in Detroit. There, as in neighboring Toledo, the city should do one of three alternatives: It should cease criticising the service rendered—such criticism will inevitably have a calamitous effect upon the *morale* of the trolley patrons as well as the employees—or it should permit a fair rate of return, or it should buy the property itself. In the case of Detroit the company long since signified its willingness to sell its city lines—at a fair valuation, of course. It is hardly two years since a commission appointed by the present Mayor, James Couzens, agreed upon a physical valuation of $29,000,000 for these lines. The company wanted something for the good will of a going concern. After some deliberation Mayor Couzens expressed his willingness to add $2,500,000 to the foregoing figure for this asset.

Unfortunately, however, Mayor Couzens did not have the last say in the matter. If he did the D. U. R. might today be a matter of mere history in the city of Detroit. Outside, it probably still would be a large factor in the traction situation in the United States, inasmuch as but 300 miles of its 900 miles of trackage are situated within those city limits. It is an interurban property of real importance, in addition to owning the city systems of Flint, Pontiac, Ann Harbor, Port Huron and one or two other fairly important Michigan towns. The remarkable recent growth of them, due to the rapid expansion of the automobile industry, has given greatly increased earning capacity and value to the larger long-distance lines of the Detroit United Railway. Of themselves they are today to be classed at the head of the few prosperous interurbans remaining across the land. And grouped together they would form in almost any event a going traction property of no small dimensions. The D. U. R. is far from being at death's door.

The Detroit traction question apparently could not be permitted so simple a solution, however, as a choice between the three pathways which I now just indicated, in accordance with the terms of the city charter. Such an important civic matter must necessarily be submitted to the electorate for its approval. So it was that the street railway purchase plans could only become effective upon a 60 per cent vote being cast in its favor.

In all probability the electorate of Detroit does not differ greatly from that of a good many other large industrial cities in the United States, particularly those of recent rapid growth. It does very little thinking for itself. It prefers to let its politicians, and the newspapers which they control, do its thinking for it, while it hies itself to the perennially popular movies or for automobile rides off into the country. In this particular instance, however, the City Hall had approved of the D. U. R. plan. But the newspapers for once apparently were not in accord, it seemed, with this font of wisdom.



FRANK W. BROOKS

President and general manager of the Detroit United Railway, from his most recent photograph. Mr. Brooks is both steam and electric road trained from the ground up, his having been no flowery bed of ease. He can talk in engineering terms with the company engineers, in electrical terms with the power men, in construction terms with the track department and he knows car building from trolley wheels to truck wheels. He is equally familiar with publicity, having in his younger days been connected with the detail workings of a newspaper. Golf and fishing constitute Mr. Brooks' recreation.

At any rate, the proposal was voted down.

COMPANY OFFERS VARIOUS SOLUTIONS

The traction company then turned toward the well-known Tayler plan of Cleveland as a possible pathway out of its troubles. In conjunction with the then existent street railway commission of Detroit it sought to work out an adaptation of this scheme which would be best suited to the needs of its own community. For the moment, a charter mandate looking toward a genuine municipal city railroad was overlooked. Perhaps Uncle Sam's experiments with the steam railroads, the telephone and the telegraph were bearing some sort of real fruit up there in Michigan.

Once again the Detroit United's experts turned their patient attention to a workable and possible permanent solution of a problem that had begun to seem well-nigh unending. In this connection it is perhaps worth noting that in the past eleven years upward of $750,000 has been spent by the city of Detroit alone in attempts to work out a solution of this one problem. What the D. U. R. has expended—in time and in worry as well as in money—cannot be set down. I am perfectly willing, however, to make a conservative guess that it nearly if not entirely equals the expenditure reached by the city, with the net result of nothing tangible or definite accomplished. And Detroit folk are still riding on a street railway system which, chiefly because of the hubbub and confusion of the politics that has been wished upon it, particularly through the past decade, has not advanced sufficiently to keep any sort of pace with the great demands made upon it by one of the fastest growing cities of America. Plans and super plans are all right in their way. But they are neither tracks nor trolley cars.

Yet plans, by the dozen and by the score, have been made. Some of them are ingenious, some remarkably simple, the most of them highly practicable. Experts of nation-wide prominence, William Barclay Parsons, H. M. Brinckerhoff and Bion J. Arnold among them, have worked side by side with local men of no mean ability. The street railway commission which was appointed to work out the service-at-cost plan, based upon the Tayler plan of Cleveland, was itself composed of three Detroit men of long business

experience and sagacity. They worked long and faithfully on the problem.

But when they too were done the results of their labor also was *nil*. Mayor Couzens flatly refused to commit the city to the service-at-cost plan. He announced that he was for a straight municipal railroad and that at once; maintained stoutly that this was the spirit of the city charter which Detroit adopted two years ago. Therefore, despite stout demands on the part of many folk, he refused to put the plan to the referendum. The company, however, was not daunted by the doughty Mayor. It went right past his office and into the hall of the Common Council. To that august body it put its necessities—and its plan. The Council inclined toward the plan, passed the necessary enabling resolutions and ordinances, which the Mayor promptly vetoed. The Council then moved to pass the measure over the Mayor's veto. And nearly did it. The vote of a single Councilman prevented this practical and wise compromise measure coming into effect—the practical solution of a vexing problem. And Detroit still was without transit relief.

I wish that I might accurately depict how much the new fourth city of the United States needs this relief; not elaborate subways or subway terminals such as Cleveland now seems bound to build for herself—although Detroit has already planned a subway terminal to relieve the almost interminable congestion in her civic heart—but new surface lines in her great outlying sections, which have come from truck gardens yesterday to acres upon acres of small, neat new homes today, as well as the main-stem and crosstown lines to concentrate and to distribute these new outlying routes.



Detroit is the center of one of the largest and most important interurban systems in the country. All of the lines shown on this map are controlled by the Detroit United Railway

A man who rode beside me one day not long ago in the fast limited car on the interurban down from Flint complained bitterly of the lack of crosstown service.

"I live over on Grand River Avenue," said he, "and when this car comes by the Ford plant on Woodward Avenue I will be within 3 miles of my house. But there is no way to get across to it, other than walking. So I am compelled to ride 6 miles down into the heart of the city at night, transfer there and ride out 6 miles again. All for the lack of a well placed crosstown line."

Unquestionably Detroit is as badly a laid out city for a million folk today as she was well designed for the two or three hundred thousand that was thought would be her maximum possible size—up to ten or twelve years ago. Her ingenious plan of radiating streets, shooting out like spokes of a double wheel from her two civic centers downtown, was very good for a city whose homes and factories could be comprised within a radius of 3 miles or so. For one demanding a radius of 6 or 7 or 8 miles it is of little practical use; far inferior, in fact, to the straight checkerboard pattern of so many of our American cities. Yet her badly devised and much overgrown city plan could be fairly taken by crosstown lines—lines such as my friend, the fellow passenger down from Flint, needed to get him over to his home and supper.

Now what has happened in regard to these crosstown lines? For a long time past the Detroit United has stood ready and willing to finance and to build them. A route that it chose for one of these was through High Street. That was all of seven years ago. The very suggestion met with great acclaim on the part of the residents of one of the most rapidly growing and poorest served new sections of the city. People really want it. Was the line built? Answer: It was not. One of the then members of the Common Council was reputed to own property on another cross street which might have been used for a crosstown line, although, in the judgment of traction experts, not as effectively as High Street. The obdurate Councilman, even if he failed to get a new trolley route past his own holdings, did succeed in preventing any other being built. And the Detroit folk who walked long blocks in bad weather getting to and from the nearest trolley cars did not understand why they could not have genuine transit relief.

A Test Period of Fares

With the service-at-cost plan buried—and seemingly without the slightest hope of resurrection—the harassed and perplexed traction company turned toward at least temporary relief in its fare situation. Its term franchises expired on the downtown section of two of its main-stem streets—Woodward Avenue and Fort Street—and yet with its cars operating on those tracks merely as a public necessity and on a day-to-day basis, it still possessed nearly 300

miles of other trackage in Detroit, to say nothing of those 600 miles of interurban line that we have already seen. Yet even if *all* of its city franchises had expired it still would be in need of fare relief—of a definite sort. For Detroit has by no means been exempted from the causes and conditions that have jammed up the cost of street car operation in the towns big and little all the way across the land. On the contrary, her local industrial situation has made her a remarkably difficult and expensive town in which to conduct a business of any sort.

Mayor Couzens, under the pressure of a real traction crisis, announced his perfect willingness to put this question of increased fares up to arbitration. Mr. Couzens may be radical, but he does not seem to be mean. His attitude is one of extreme generousness. He is pledged, however, to the idea of a municipal street railway for Detroit and is nothing if not consistent.

So it was that the question of increased fares—the D. U. R. had intimated that the retention of the 5-cent fare, but with a charge of 1 cent for transfers, would give it a breathing chance. In fact it went so far as to endeavor to put such a fare into effect—with the almost usual accompaniments these days of a strike of its platform men for additional wages and a three-day suspension of trolley service and great expense and annoyance to the citizens of the town. Out of the protests of these bewildered folk, in fact, came the Couzens agreement to arbitrate the entire fare question. Arbitrators were appointed and a test period of three months chosen to see if the company needed the raises in fare.

Once again the Detroit United played out of luck. It almost seems fated—hoodooed is perhaps a still more expressive word. In the three test months—July, August and September, 1919—it did a humming business. The flush after-the-war period was well upon the city by the straits. People rode upon the trolley cars of Detroit—in dull hours as well as the busier ones—as they apparently had never before ridden. The company failed to make its hard-up showing and its fare remained at 5 cents with free transfers. And so still remains.

Plans for a Municipal Railway Become Definite

In the meantime Mayor Couzens had not been idle. He is not of the idle sort. In these repeated failures of the various plans of the D. U. R. he saw the hour of his own opportunity looming large. He decided last spring that the time had come to make his plans for a municipal street railway definite. So more experts and more engineers were imported and, with the aid of the city's own engineering department, a scheme was evolved for the construction of 163 miles of new trolley line. In addition to these the Mayor planned to take as downtown main stems the lower portions of the Woodward Avenue and Fort Street lines of the Detroit United Railway, upon which



With its system of radiating avenues from the civic center, Detroit is well adapted for street transportation

you will remember the term franchise had expired and where the company was, and still is, operating without franchise and under a so-called day-to-day agreement as a public necessity. There are 55 miles of this last type of line, including a few miles of new trackage built as an emergency and also operated on a day-to-day basis, which brings the mileage of the proposed municipal system to nearly 218 miles.

The new trackage of this civic railway is practically all of it located in the outlying sections of the city. It is divided into three groups —for convenience lettered alphabetically—and of which the third grouping, Group "C," about 59 miles, is not planned to be built at the present time. That leaves about 103 miles of actual new trackage to be constructed. To build this new line, as well as to equip it with cars, carhouses, shops and power houses, Mayor Couzens' engineers have estimated will cost $15,000,000, and on a day last April he went to the people of Detroit and asked them to give him a referendum appropriation for this very sum. And still the Detroit United Railway played out of luck. Its hoodoo is a most persistent sort of bird. Only about 45 per cent of the intelligent electorate of the town voted, but more than the required 60 per cent of the actual voters approved of the Couzens plan, whereupon the Mayor proceeded toward actual construction of his street railway—until the existing company stepped in and tied up the matter in an action in the federal court. It claimed that there were doubts as to the validity of the election; as to the way in which it was held and the manner in which the votes were cast. All of which are technical questions and will be finally decided by the Federal Supreme Court, in due course.

Position of Car Riders in Jeopardy

In the meantime let me attempt a final analysis of this most perplexing Detroit question. The Couzens railway scheme if carried out as planned provides a traction system of most unusual appearance. It is forced by that self-same peculiar street conformation of the city to use the expired franchise routes of the Detroit United in Fort Street and Woodward Avenue to bring its new lines, builded almost entirely in the new outlying sections of the city, downtown. In the case of Woodward Avenue this is particularly unfortunate, for with the utter lack of foresight, common to so many of our American cities, Detroit failed a dozen years ago or more to widen this street to the



This photograph shows the men leaving work at the Ford plant lined up to board cars. In this way rapid loading of cars has been obtained

dimensions that its real importance as the chief thoroughfare of a city of more than a million folk demanded. Now it is too late. Great and permanent new buildings of a type not easily removed or altered line it upon either side. Yet through Woodward Avenue there pours today a trolley traffic that is reputed to be greater than that of any other street of the United States, although the D. U. R. pours no feeding lines whatsoever into this main thoroughfare, reserving it for the cars of the Woodward Avenue service alone and an occasional interurban in from Ann Harbor, Pontiac or Flint.

What the Couzens Plan Means

With the Couzens municipal plan in effect four outlying surface car lines to the west and one to the east of the outer sections of this street will have to be poured into and through its narrow and congested downtown section—between the Boulevard and the Grand Circle. And congestion worse congested.

"But how about the Detroit United's service and that of the interurbans too?" you interrupt. "How are these to be brought down into the heart of the city with the downtown Woodward Avenue section taken from the old company

Please do not worry about the interurbans. The local merchants will see to it that they are not disturbed in getting to downtown Detroit. They bring too many millions of dollars in trade to their stores in the course of a twelvemonth to be easily turned aside. And as for the D. U. R. cars in outer Woodward Avenue, they can also be taken care of, quite easily. The company, perhaps with an anticipation born of real foresight, long ago paralleled Woodward Avenue with double-tracked relief routes; one on each side of that great main-stem street. Its position is quite secure.



This view was taken on Jefferson Avenue, which runs nearly parallel with the Detroit River. The photograph was taken near the junction with Woodward Avenue

It is the position of the car riders, of the million or more Detroit folk, which is most in jeopardy, it seems to me. With two systems their general system of universal free transfers, such as they are enjoying at this moment, becomes an impossibility. Two fares, in some cases three, will have to be paid where they now ride for one, and could continue for a long time to ride for one, with the possible addition of a penny or two for transfers. The burden of the worry has been shifted to their shoulders.

For impressive as the Couzens plan is in all of its maps and prospectuses, it is somewhat less so when one comes to examine its financial outlines. According to the Mayor's plan, as outlined to the Council, the sum to be expended reaches $15,022,000, divided as follows: $2,220,000 for the 55.5 miles of trackage now being operated by the D. U. R. under the day-to-day agreement, $7,052,000 for the new trackage, $4,000,000 for 400 motor cars, $750,000 for 150 trailers and $1,000,000 for carhouses, tools and equipment. Analyze these figures for a moment. Start with the second item. Mr. Couzens proposes to spend $7,052,000 for 103.05 miles of new track—the Class C group of 59.7 miles being, as we have already seen, deferred for the present—which figures close to $68,432 a mile. Yet, coming back to the first item, the Mayor of Detroit only proposes to pay the D. U. R. $40,000 a mile for its 55.5 miles of line.

"The Mayor counts without his host," said President Brooks of the Detroit United to me the other day in referring to this very point. "He has no right to assume that we would sell at this or any other price yet fixed. He is proceeding upon an entirely unwarranted assumption."

To an unprejudiced outsider it might seem a little inconsistent that the city should expect to buy existing line at $40,000 a mile when it proposes to pay $68,000 to build new trackage. Assuming for the moment that it could force the D. U. R. actually to tear up its tracks in the franchiseless streets—although I am quite sure that such a stroke would

bring down almost interminable legislation—it immediately would be forced to the latter figure of expenditure.

In fact, it is interesting to notice that Parsons, Klapp, Brinckerhoff and Douglas in making their estimates of an enlarged transit for Detroit placed the cost of new surface lines there at an average of $75,327 a mile—considerably ahead of Mr. Couzens' figure. At these figures the Mayor's 103 miles of brand new track would cost $7,762,447, or about half a million dollars in excess of the budget which his own engineers have prepared and which was used as the basis of the special election.

It would look as if Mayor Couzens has been equally conservative in some of the other items of his estimate. It allows $10,000 apiece for modern motor cars and $5,000 for trailers. The Mayor may have an inside line on the equipment market such as the D. U. R. does not possess. Its current prices on the first of these is $15,000 each, on the second $9,720. Applying these to the Mayor's car necessities, we find his rolling stock item increased from $4,750,000 to $7,458,000, a mere matter of some $2,700,000. Similarly, I have been assured that the Mayor's items for carhouses and shop equipment show equal if not greater conservatism. This is not the day of low building cost, particularly in the city of Detroit.

I am setting these facts down without any rancor or prejudice whatsoever. It may be that the time has come for Detroit to own if not to operate her city transportation service. I talked with a pretty big business man of that town within a fortnight after its most recent traction election—a man, incidentally, whose business affiliations do not ally him with or against its street railway organism—and he expressed his opinion that the city should now buy the D. U. R. and then turn it over to that company for simple and efficient operation. His thought was that a plan which would be somewhat similar to that of the operation of the New York subways would best meet the present necessities of the Detroit situation.

"I know Jim Couzens and like him very much," said he, "but for the life of me I cannot see why he should want to expend $15,000,000 or more for a parcel of indifferent suburban trolley lines when by an expenditure of hardly more than twice that figure he could have the whole city traction system—lock, stock and barrel—and by the expenditure of a very few extra millions the essential feeding lines from the outer districts could be laid down."



Another view at the Ford plant. Queue loading has been employed at congested points in Detroit for some three years and has been applied even in the heart of the city

Detroit Must Work Out Its Own Problem

For myself, I think that this hard-headed Detroiter has much the right point of view. The problem for him—and really not so much for him as for the trolley riders of that big and overgrown town—is to give proper expression to it. It is not a matter in which the traction interests of the city can help him in the slightest. Their turn is over. They have had their hour in the court of public opinion.

The courts of justice are their final resource. In the meantime their cue is silence. They must sit back. Detroit must work out her own salvation—in this as in her other great and grave civic problems. No one can do that for her. If she fails in this she will have no one to thank save herself. If she succeeds, it will be she herself who will reap the full results of her triumph.

In his next two articles Mr. Hungerford will describe interesting situations on the Pacific Coast. In San Francisco there is actual competition between a municipal line and one privately owned and this will form the topic of the first article by Mr. Hungerford.



The junction of Woodward Avenue and Michigan Avenue. The trolley line on Woodward Avenue carries a traffic almost as heavy per mile of track as that on the New York elevated lines

C. E. R. A. A. Meets at Ottawa Beach

Daily Versus Weekly or Monthly Freight Settlements Chief Subject of Discussion at Accountants' Convention

FOLLOWING the meeting on July 8 and 9 of the parent association, the Central Electric Railway Accountants' Association met at Ottawa Beach, Mich., July 10 for a half-day session. Those present were A. R. Baxter, vice president of the association, who presided; Secretary Neereamer and assistant and Henry Friede, Toledo, Ohio; F. A. George, Kokomo, Md.; W. E. Livingston, N. M. Viergwer and Miss L. E. Jones, Grand Rapids, Mich.; F. Pantel, Michigan City, Ind., and J. P. Longon, Dayton, Ohio.

The small attendance of this and several preceding meetings led to the passing of a resolution by the executive committee, later ratified by the general body, instructing the executive committee to address a strong letter to all members urging attendance and stating that unless greater interest were taken and unless the next meeting were attended by 60 per cent of the members it would seem that the association should be abolished and that steps probably would be taken in this direction. It was pointed out in the discussion that a great many of the members show a distinct interest in the work done by a meeting, but are unwilling to give any time or effort to the association.

Two amendments to the constitution, one defining who shall be members of the executive committee and the other changing the number of regular meetings of the association from four to two a year, were adopted.

It was decided that the next meeting will be Jan. 21 and 22 at Dayton, Ohio. The following nominating committee for report at the January meeting was appointed by Mr. Baxter: F. Pantel, chairman; J. P. Longon and L. T. Hixon.

The remainder of the meeting was devoted to the reading of two papers on daily rather than weekly or monthly freight settlements, by Mr. Longon and H. F. McColgin. The latter was read by the secretary in the absence of the author. These papers are printed below.

Mr. Pantel discussed the subject briefly, pointing out the practice of his company, the Chicago, Lake Shore & South Bend Railway, of making a weekly settlement to conform with steam road practice, this company being a member of the American Railroad Association. He said there was great difficulty in getting even weekly settlements made, the agents contending there was not sufficient time to make out these reports. He thought the expense of daily settlement would be too great.

Daily Reporting of Freight Accounts

BY J. P. LONGON
Auditor Cincinnati & Dayton Traction Company, Dayton, Ohio

THE question has come up several times relative to the merits of daily reporting of freight and express business by agent to auditor, and as a means of ascertaining the true merits of the daily system a committee was appointed at the last meeting of this association, held at Indianapolis, Ind., April 24, 1920, consisting of J. P. Longon, Orin A. Small and H. F. McColgin. The committee sent out a request for a set of forms and an expression from the various auditors as to the merits of their systems and the approximate amount of clerical energy expended in the carrying out of their respective systems. Only a few of the auditors responded to the request and to the ones who responded the committee extends its thanks; to the ones that ignored it we feel that the spirit of indifference or procrastination kept them from conforming with the wishes of the committee. It was found that of thirteen companies which replied to our request five used the daily system and six used the monthly, while one used a semi-monthly system and one used the weekly. It was found that of the companies using the daily system most all were the smaller companies, while the larger companies used the monthly system. The clerical energy used was in most cases the same, as more labor is required in checking daily reports in the same amount of volume than is required by monthly checking, as the monthly audit is a comparison of totals from one station against the total of other stations, and where they agree no further checking is required, while where they disagree it is necessary to check back to locate errors. We find that the monthly system is the cheapest for large companies, but the question of economy is sometimes open to argument, for it has been the experience of the writers that very often an agency is located in a country store where the railroad work is a side issue and the agent is paid on a commission basis and the agent withholds the company's cash to run his store business until the end of the month, while if a daily system were used he would have remitted all of the cash to the auditor daily. On one line that the chairman of this committee was sent to systematize he found a comparatively fair-sized station located in a village post office. It was arranged with the United States postal inspector to audit this station on consecutive days. The government inspectors found that no segregation of cash was kept, which was contrary to government rules, and this postmaster only escaped serious trouble by his plea of ignorance and the influence of his friends. His real trouble was encountered the following day when his railroad accounts were audited, for he had taken all of his cash to satisfy the post office account and was considerably short in his railroad accounts. He had been speculating in stocks and was using the railroad company's funds, using the argument that he did not have to settle up but once a month, although a daily cash remittance was expected and was made, but same was short daily.

The most meritorious feature of the daily system is the fact that it compels all agents to remit in full for each day's work and it enables the auditor to drop in at any station for a surprise check, needing only the last day's report. This cannot be done with the monthly system in vogue. With the daily system the agent shows the balance due from yesterday and all debits and credits affecting the current day's business and balance due company; this balance is supported by uncollected expense bills on hand. It is a wonderful aid to an agent,

for he gets his corrections daily and can take them into account the same day as received. A summary book is kept by some companies using the daily system, into which the agent enters the totals of all his books, which in turn must agree with the totals of his various debits and credits on his daily balance sheet; the totals of this summary book are the figures he uses on his monthly balance sheet. It is possible to have the agency account at all stations clear by the 5th of the following month, as his monthly totals are ready as soon as his last day is balanced; as sub-totals are carried in his summary book, all that is then required is to draw off a list of his uncollected expense bills. This could be ready by the 3d of the month, but it is good practice and saves listing of many current bills by allowing the agent to withhold his list of uncollected until the 5th, listing all bills open on that date and showing the amount of cash remitted to auditor between the 1st and the 5th as transit cash; the total of both these items must agree with balance due company on monthly report.

The agent should not have any ancient items on his list of uncollected if auditor will issue reliefs promptly upon proof of agent's request.

Statement of differences are not required, as agent gets reports of his differences daily, and if he takes these into account daily he should balance clean at the end of the month.

Agent should stamp off his cash book postings against his received collect and prepaid forward, so that in event of his uncollected not balancing with amount due company he can check his list of uncollected against the unstamped items in the received and forwarded books.

The freight accountant keeps a register on file of all corrections sent to agents and as soon as agent takes same into account he removes his copy of corrections from this file, so that at all times he has file of corrections issued and not taken into account. Copies are sent to agent if not taken into account in due time.

Another feature of daily reporting is in furnishing the traffic department with information relative to the movement of freight daily both c.l. and l.c.l. On some lines considerable car-load business is done and special reports are kept on these movements.

In Cincinnati during the barleycorn days the steam lines made a special effort to get the whiskey business between Cincinnati and Toledo. The daily reports divulged a falling off of whiskey shipments and investigation was begun before the end of the month in question, and not only did the interurbans regain the lost business but were successful in procuring considerable new business.

Again we were short on trail car equipment and it was necessary to refuse carload shipments, and within a few days the daily reports divulged a falling off of business from Middletown station. This was pointed out to our traffic department and it found the tobacco companies closed for inventory and repairs. The equipment used in this service was pressed into Cincinnati service and daily revenue again picked up. It follows that in many instances the agent will pursue the course of least resistance and will not report the falling off of business, but the daily report is the "telltale." It follows also that a telltale that points out daily a decrease in revenue is far more valuable than one which acts but once a month.

It appears to us that the economy effected by the monthly system is of a false nature, inasmuch as it does not give the operating officials the information which enables them to regulate their service to the best advantage. It does not show up any falling off of business from any specific station until the end of the month. It does not show the loss of certain kinds of shipments, as often happens through failure of some one along the line to give the kind of service expected, until possibly a month after it occurs. It also does not show the fruits of solicitation or advertising.

In this age of motor transport it behooves the interurban railroad to be on the alert and give the shipper 100 per cent efficiency in service, for that is our stock in trade, as this is all we have to sell; let us be ever on the alert to keep our shippers satisfied, and the daily system is our ace card, for it tells the daily progress of our transportation department; it enables us to tell, by passing records and abstracts, the daily movement of each and every piece of freight from station to station, which reduces tracing and claims, also the clearing up of O.S.&D. items, and these also tend to retain your shippers by giving satisfactory service.

The wise business man today is he who knows what he is doing in volume today, not thirty days from now. It behooves us to give careful and scientific study to our work, and if we are to be properly recognized the system of accounting installed in our departments must give the best results, not merely the "getting by," but the furnishing of the most valuable information in time to be of value, and not to be rendered as ancient history, with the time-worn label of "too late" to be good.

Daily Freight Settlements by Agent to Auditor

By H. F. McColgin
Auditor Indianapolis & Louisville Traction Railway

THE question of the daily freight settlement is advocated by some and opposed by others. The writer, being a believer in the daily method, will attempt to show in a brief way the grounds for his belief. Having been at one time connected with the Pennsylvania Railroad Company, I have taken its system as the basis for my arguments. In order to discuss the subject, I will divide it into two parts, the old and the new.

I will first take up the old plan of monthly settlements. I regret that I was unable to secure a set of the old blanks for exhibit, but will refer to them by their form number. Under the monthly form of settlement the agent filed his waybills each day, usually filing the larger stations separately and smaller stations in one file; by that I mean stations from which a number of bills are received daily would be kept separate, while stations from which only a few bills were received would be placed on the miscellaneous file. At the close of the month's business (by that I mean when all bills dated in the month for which report was being made were supposed to be in) the agent would separate his waybills, according to number and station order, and list them on what was called the "B" report, showing date, waybill number, freight advances and prepaid. These reports carried two columns of waybills, and the average station would have from ten to forty sheets of received business to total recap and balance with his freight received book, thus making twice that all bills were written up. All forwarded waybills were recapped each day, and at the end of the month were gone through again and all prepaid waybills listed on a "C" report

and balanced. From these two reports the figures for the monthly freight settlements were taken. With this explanation, we will take up briefly the new or daily method.

METHOD WHEN DAILY SETTLEMENT IS USED

Under the daily settlement method a loose leaf system is used. When the extensions on the received waybills have been checked and any errors are corrected they are entered on the daily sheet, known as Form 723A, a carbon copy being made, which is retained by the agent for his permanent record. These copies are bound in binders furnished for that purpose. The original copy, balanced, and with all waybills securely attached, is forwarded to the auditor of freight receipts at the close of each day's business. Waybills for freight forwarded are handled in the same manner, except that they are listed on a separate form, No. 693A.

A day's business consists of the waybills actually issued and those actually received, with the exception that where the shipment is short the regular short report is made and the waybill is not taken into account until shipment is received. When these reports have been completed the totals are listed on a summary sheet, having a place for each day of the month, and, unless corrected by the auditor, the agent's record is finished. At the end of the month the summary is totaled and agent's report for month is complete and supposed to be in auditor's office on the third day of the succeeding month.

What is gained by the daily method:

1. A great saving in time to agents, who, as a rule, have more work than they can properly handle.

2. It gives the auditor's office a closer check on company's business and enables it to compile statistical information at any time it may be desired.

3. It practically eliminates, or, at least, greatly reduces, the amount of on-hand uncollected at close of month, owing to the fact that any waybill not received by the last day of the month is carried to the succeeding month's account.

4. It enables the auditor's office to close up monthly records much sooner.

It is claimed by some that this plan requires a great increase in office force. However, I am informed by the auditor of the Pennsylvania lines that it causes about 5 or 10 per cent increase in office force. This would mean that an office employing twenty clerks would need one more clerk.

Combined Overhead Crossing and Landing Platform

San Francisco Municipal Railway Constructs Some Concrete Work Along Pleasing Lines—Mission Effect Used

THE accompanying photographs show an attractive reinforced concrete footbridge which was built by the Municipal Railway of San Francisco for carrying the Nineteenth Street pedestrian traffic over the line of the Church Street railway tracks, giving access to Mission Park from Church Street. In connection with this footbridge two concrete landing platforms were constructed. The entire structure is built in mission style.

One of the most interesting features of this construction is the electrical work. Two electroliers were installed alongside the landing platforms, each equipped with five 23-watt Mazda lamps burning five in series on 600 volts. A galvanized switch box installed on the face of the abutment wall and fitted with a G. E. combination switch and cutout permits control of the current for both electroliers.

Between the platforms 43-lb. guard rail sections were bolted onto the inside of both rails of both tracks with ¾-in. track bolts. The spaces between all of the rails of both tracks and between the rails and the concrete curbs of the platforms were filled with ballast and screenings and covered with an asphalt wearing surface 1 in. thick.





AT LEFT, FOOTBRIDGE AND LANDING PLATFORMS BUILT BY MUNICIPAL RAILWAY OF SAN FRANCISCO. AT RIGHT, LOOKING DOWN ON THE CHURCH STREET TRACKS FROM WALK LEADING TO MISSION PARK

All concrete floors and walks, stair risers, etc., were finished with a ¾-in. top coat composed of one part cement and one part fine gravel, hand troweled to a smooth finish. Lamp black was used to give the finished work a uniform dark slate color.

The entire inside surface of the arch from face to face and all exposed concrete surfaces of the bridge were finished with two coats of cement mortar. The first coat, ⅜ in. thick, was composed of one part cement, hydrated lime equal in volume to 10 per cent of the cement, and three parts sand. The second coat was applied by means of the cement gun. It consisted of cement mortar in the proportion of one part cement to two parts of sand.

An open-joint drain is carried through Mission Park, laid between the tracks. Concrete gutters also parallel the tracks through Mission Park. At landing platforms these gutters connect with pipe that extend under the platform, as shown in one of the illustrations.



OFFICE BUILDING

Some "Empire United" High Spots

On a Recent Visit the Writer Was Favorably Impressed by the Operation of This Interurban Road in Central New York

BY M. C. TURPIN
Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

A REFRESHING example of an electric railway property that is successfully endeavoring to reduce operating expenses and at the same time furnish better service is to be found in the Empire State Railroad. This property was formerly a part of the Empire United Railways, Inc., which a few years ago was reorganized and divided between two companies. The Empire State Railroad Corporation, with its main office at Syracuse, N. Y., assumed the ownership of the line from Syracuse northward to Oswego and the line between Auburn and Port Byron, connections being made with the New York State Railways, the Auburn & Syracuse Electric Railroad and the Rochester & Syracuse Railroad, as indicated on the accompanying map. The territory served, which includes the cities of Syracuse, Auburn, Baldwinsville, Phoenix, Fulton and Oswego, has a population of approximately 250,000. It is an unusually fertile country as well as one supporting many industries, forming withal one of the most attractive sections of a state noted for its scenic beauty. The line between Syracuse and Oswego, a distance of 40 miles, is paralleled by both the New York Central and Delaware, Lackawanna & Western Railroads, but through superior service the electric line gets a good share of the business. The distance is covered by regular electric trains in one hour and forty minutes and by "limiteds," operated on Saturdays and Sundays, in one hour and twenty minutes. In addition to the interurban service the company operates city cars in Fulton and Oswego and handles an extensive summer business between Syracuse and Long Branch Park, a pleasure resort on Onondaga Lake. The advantages of handling freight traffic are fully appreciated by the company, which operates two two-car trains each way every day, except Sunday, between Syracuse and Oswego for handling local freight between these and intermediate stations. Handsome, stucco-type, combination passenger and freight stations are located at Syracuse, Baldwinsville, Fulton and Oswego, at each of which an agent is maintained. Attractive stained-wood shelter stations are located at various numbered stops along the lines. An effort was made to heat these shelter stations with electric heaters, but owing to the destructive proclivities of children and maliciously inclined adults who made a practice of breaking up the heaters, these efforts were abandoned.



MAP SHOWING LAYOUT OF EMPIRE STATE RAILROAD AND SURROUNDING TERRITORY



AT LEFT, CARHOUSE; AT RIGHT, SHOP





AT LEFT, VIEW OF THE TRACK, CAR, TRANSMISSION LINE AND CATENARY LINE CONSTRUCTION; AT RIGHT, TWO-CAR TRAIN



LEFT TO RIGHT—SHOP, CARHOUSE AND OFFICE BUILDING

The length of road operated by the company is 57.6 miles, the trackage being 83.9 miles, about 50 per cent of the route being double-tracked. The rolling stock consists of seventy-four cars, apportioned as follows: Interurban, closed, eighteen; open motor and trailer, fifteen; city, closed, seventeen; city, open, six; freight, four; work, two; snowplows, four; sweepers, two, and miscellaneous, six.

The original closed interurban equipment consisted of twelve cars, each having four Westinghouse-119 motors, the electrically heated cars having a seating capacity of fifty-eight passengers and the stove-heated cars a capacity of fifty-six passengers. Appreciating the saving to be made by operating lighter weight cars, the company converted six trailer cars into motor cars by installing vestibules, sash, electric heaters, etc., and equipping them with four Westinghouse 101-B motors, which were in use under open motor cars. These converted trailer cars weigh approximately 56,000 lb. completely equipped, as compared with a weight of 95,000 lb. for the original interurban equipment.

The lighter cars are generally used for the shorter runs and extra service. In the summer these motor cars draw the open cars, from which the motors were taken, as trailers. The company estimates that by the use of this equipment approximately $1,000 per month is saved in the cost of power.

Power for the operation of the road is obtained from the Niagara, Lockport & Ontario Power Company at 33,000 volts and distributed to four substations, with a combined capacity of 2,900 kw., located between Oswego and Syracuse. Power for operating the Auburn-Port Byron branch is obtained from another substation receiving power from the same power company. Three of the substations are equipped with two 400-kw. Westinghouse rotary converters, and one with a 500-kw. converter of the same make, with the necessary transforming and switching equipment.

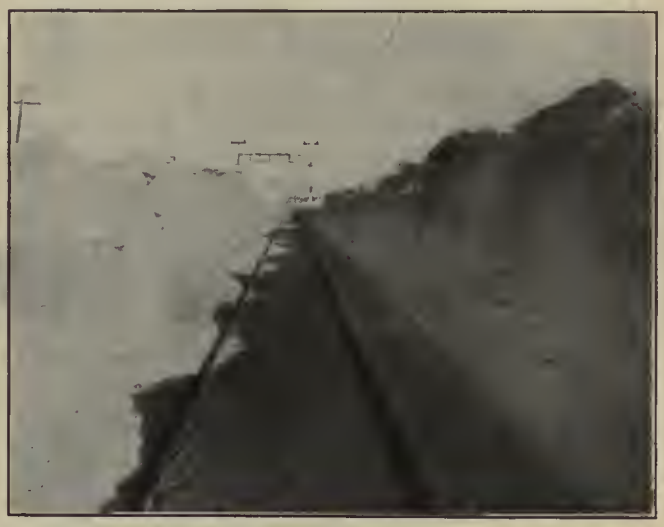
With the exception of about 7 miles, the line to Oswego is of catenary steel-bridge type construction, a 500,000-circ.mil feeder cable being used as a messenger wire. This construction was described in the ELECTRIC RAILWAY JOURNAL for Oct. 14, 1914. In the process of rehabilitating the road, the company has installed twenty miles of new No. 0000 trolley wire. The lines are protected throughout by automatic block signals.

The writer, on a recent visit to this property, could not fail to be impressed with a number of features connected with the operation of the road that seemed to indicate a progressive spirit on the part of the management, and not only a laudable purpose of reducing operating expenses but also one of furnishing better service and catering as well to the needs of the employees. A few of the "high spots" among these features may be mentioned.

Every passenger car is washed at frequent intervals, at least every week. This not only keeps the paint on the cars in good condition, but improves their appearance and creates a much better impression of the road among the passengers. The company believes in furnishing service as well as transportation and believes that the average passenger, as a rule, will not notice a clean car particularly, but he or she will notice a dirty or ill-kept car and will not hesitate to condemn it in no uncertain terms. Therefore, every effort is made to keep the cars clean and sanitary. They are also painted at regular intervals, the company having adopted the Pennsylvania Railroad red as the standard color for all of its cars.

As fast as is practicable all the cars are being thoroughly rehabilitated, the equipment overhauled, new toilets installed and the present side horizontal-burning lamps changed over to center vertical-burning ones. The relays for operating the control system have been mounted in the motorman's cab under a glass case so as to protect them from snow, dust and dirt.





1920 SNOW SCENES ON THE EMPIRE STATE

Another progressive feature adopted by the company is the use of what is known as the queue, or single file, method of loading men on the cars at industrial plants located on the lines. This plan was put into effect as far back as 1917, at an army camp located near Syracuse, where considerable trouble had previously been experienced in loading soldiers on the cars. This method has been adopted by the Holcomb Steel Company and other industries along the lines with most satisfactory results. It entirely eliminates crowding and the fighting which frequently ensues, permits a quicker "get-away," and consequently improves traffic conditions.

As previously mentioned, the company does a good summer business to Long Branch Park on Lake Onondaga, which is greatly augmented by the handling of a large number of picnics. The regular excursion rate

from Syracuse to the park is 25 cents per round trip, whereas the company sells tickets in lots of 200 or over at 20 cents, allowing the organization holding the picnic to make the extra 5 cents. Nor does the company overlook the needs of its employees. The offices and shops are located in a well-built and well-lighted, spacious group of buildings, about four and a half miles from the center of the city. This location is, therefore, not well situated in regard to lunching facilities. The company has installed in the office building a diner and cafeteria open to all employees. Food is bought in town, brought out over the company line, cooked on an electric range and served by girl employees. It is supplied practically at cost prices. An electric dishwasher is included.

The management of the company is under the supervision of Ford, Bacon & Davis, engineers, with J. C. Nelson, recently elected president, in direct charge.

Saving $900 a Month on Printing

The Railway and Electric Company of Atlanta Has Cut Its Printing Costs in Two by Doing Its Own Work

UNABLE to get satisfactory composition from the printers of Atlanta, the Georgia Railway & Power Company determined to do its own printing work. To this end it has gradually equipped a print shop in the office building of the company with the necessary machinery until, during the past year, it has been able to do the greater part of its own printing.

The start on this policy was made by installing two multigraph machines as a means of demonstrating what could be done in the way of savings for the company without too great an investment. These machines were used for about a year, and W. H. Smaw, purchasing agent, was satisfied that there were possibilities warranting further investments. With about 750 sq.ft. of floor space available in the company's office building, equipment has been added until at the present time it includes one Kelly automatic press, two 10-in. x 15-in. Chandler & Price presses equipped with Miller feeders, one 8-in. x 12-in. job press, one large and one small wire stitching machine, one power paper cutter, one power punch, one power perforator, two make-up stones and a large supply of type of various kinds and sizes. The investment involved is about $8,000.

With this equipment, it is possible to do practically all such printing as the various office forms, the trip sheets, bills of lading, cash fare receipts, etc. There is, in addition, a certain amount of matter which has to be let out to the local printers. All linotype work is also done outside. The forms used by the company alone represent a very large amount of work, for there are more than 500 of them for the two companies, electric and railway, all of which are done in the company's own plant. The number of different jobs handled is shown, by months, in the accompanying statement of the plant operation. Transfers and tickets are printed only in emergency, but the company has the necessary plates always in readiness.

As a means of keeping an account of the savings which the printing plant makes for the company, as compared with the cost of having the work done outside, the cost of each job is figured according to outside printing shop unit figures, and this compared with the actual cost plus 40 per cent for overhead of doing the work in the company's own shop. Figured in this manner, the print ship showed an apparent earning for the first ten months of 1919 of $9,000.

The unit figures used in figuring the outside cost of a job are frequently checked up by submitting jobs to outside bidders. The company lets enough work out so that the local printers are always willing to bid, and by this means the foreman of the shop is able to arrive more accurately at the outside estimate for all jobs. An effort is made to figure the estimates very closely and to hold them down so that there will not be an unduly favorable showing for the company's shop.

JOBS HANDLED IN COMPANY'S PRINTING PLANT

1919	Number of Jobs	Estimated Outside Cost	Actual Cost	Approximate Earnings
January	100	$1,284.85	$687.56	$597.29
February	79	1,100.75	564.33	536 42
March	52	770.65	360.20	410.45
April	96	2,090.95	1,134.01	956.94
May	94	2,086.67	1,055.17	1,031.50
June	94	2,266.60	1,067.49	1,199.11
July	92	1,777.10	709.32	1,067.78
August	98	2,044.30	1,148.77	895.53
September	85	2,580.09	1,267.73	1,312.36
October	95	2,055.95	1,062.90	993.05
Total	885	$18,057.91	$9,057.48	$9,000.43

The actual cost figures include time and material only, plus 40 per cent for overhead expense, but with no allowance for maintenance and depreciation of equipment. The maintenance expense for the ten-months period was $751.68, which should then be deducted from the $9,000 apparent saving.

Belgium Plans Electrification

A RECENT Belgian government report on electrification recommends immediate electrification of the Brussels-Antwerp line, then the electrification of the Luxemburg main line and its branches, and at a later date the electrification of various radials out of Brussels and the Brussels Belt Line.

On the Brussels-Antwerp line it is proposed to use a two-unit train for passenger service, each unit consisting of a motor car with multiple-unit control equipment and two trailers. Each motor car is to be equipped with four 275-hp. direct-current motors. About 87 km. of main track and 15 km. of branch track are to be electrified and the service proposed is thirty-eight trains daily in each direction. Later developments recommended are double tracks between Brussels and Antwerp, with electrification for express, freight and omnibus trains in each direction. The maximum speed is to be 90 km. (56 miles) per hour with an average express speed of 83 km. (52 miles) per hour.

The freight locomotives are specified to haul 1,000-ton trains on a level at 45 km. (25 miles) per hour and are rated 1,650 hp. The freight and passenger traffic on the Brussels-Antwerp line is heavy and the power consumption is expected to exceed 100,000,000 kw.-hr. per year.

The proposed electrification of the Luxemburg lines is similar to the Brussels-Antwerp line as regards passenger equipment, but heavy grades require two freight locomotives per 1,000-ton train. The power consumption is estimated at 400,000,000 kw.-hr. per year.

Direct current will be used on the system but the specific system, whether third rail or overhead trolley, is left in abeyance until the French decision is made regarding their electrification in adjacent districts.

Motor Bus Transportation in New York*

Organization and Operating Details of a Successful Company Are Outlined — Discussion Also Given of Present and Future Possibilities in Motor Bus Transportation

BY GEORGE A. GREEN
General Manager and Engineer Fifth Avenue Coach Company, New York

THE motor bus industry is of very recent growth, but is rapidly establishing itself in popular favor. Unquestionably, the so-called "jitney" is merely a forerunner, but it is fulfilling a useful purpose, since it is creating a desire for a real bus service. I am expected to give my views on motor bus operation, and since the Fifth Avenue Coach Company is the only successful one of any size in the United States it necessarily follows that a rather lengthy description of the company's systems and methods must be given.

The three main divisions of the Fifth Avenue Coach Company are the engineering, mechanical and transportation departments. There are, of course, departments concerned with finance, auditing, disbursements, publicity, claims, etc., but these follow conventional lines and no further reference will be made to them.

ENGINEERING DEPARTMENT

At the head of the engineering department is a mechanical engineer, who has charge of all designs, research and experimental work. His duties follow closely along conventional lines. In regard to design, there is a rather general impression that the average truck chassis can be successfully employed for motor bus operation. We do not hold this view, for the average truck chassis is unsuitable for passenger transport, because the weight is excessive, particularly the unsprung weight; the center of gravity is too high, the gear ratios are unsuitable, the springs are too rigid, the spring and axle tracks too narrow, the radius too wide, the steering too stiff, etc. Briefly, it would be just as unsatisfactory to attempt to use a high-class twelve-cylinder touring car for general truck purposes as it is to expect the average truck to give efficient and economical service when used to haul human freight. The development of a new type of vehicle is an exceedingly slow process, for aside from the matter of design, an immense amount of time is necessary to prove the value of the product. Approximately 25,000 miles of operation is required to find out what is wrong after samples have been placed in operation.

We have since 1907 operated nineteen different types of chassis produced by domestic and foreign manufacturers, also twelve different types of bodies, and we have tested nearly all suitable standard engines from four to eight cylinders, as well as many different types of radiators, clutches, transmissions, axles and chassis frames. In none of these instances did we meet with entire success. Of course, our lack of standardization proved a very severe handicap. The net result of our effort was the production of complete buses that have today covered more than 20,000,000 miles. The performance of these vehicles is so remarkably superior to our previous models that no comparison is possible. In general, any large operating company will require at least two distinct types, the double-deck for large loads and the single deck for smaller loads, faster operation, express service, etc.

Assuming good roads, wide thoroughfares and reasonable freedom from overhead structures, the fifty to sixty passenger, very low hung double-deck vehicle, capable of handling a trailer, seems to have great possibilities. This class of vehicle, jointly operated with the single-deck, one-man controlled type, pneumatic-tired bus, appears to me as being a logical scheme, especially where peak loads must be handled largely without surface car or subway aid.

There are those who believe that the trolley car propelled by a gasoline power unit may supersede the present equipment. In my opinion this theory will not bear close analysis, for the greatest asset the trolley car has is cheap power, and if you take this away the structure falls to pieces. A gasoline-propelled trolley car is a bus, minus nearly all the advantages of the latter. It is, of course, true that a much lighter and better design of trolley car could be produced and a gasoline power unit embodied in it. It is equally true that the cost of operation of such a vehicle might be less than that of existing types of trolley cars, but my contention is that if the same care and attention to design were applied to the conventional article still better results would be achieved. The fact is the present design of trolley cars is more or less crude and out of date, for they are as a whole built as strong as possible and not as weak as possible, which is a much more logical and economical procedure. To sum up, trolley car design has not marched with the times.

RESEARCH DEPARTMENT

This department co-ordinates the work of the design, repair and operating departments. Briefly, the duties and responsibilities of a research department are as follows: (1) Analysis and recording of all breakages, failures, etc., (2) operation of the dynamometer, (3) continual study of the fuel situation, (4) testing of materials, such as fuels, oil, etc., (5) perusal of all trade journals, (6) standardization program. We regard the analysis and recording of all breakages, failures, etc., as of great importance. The research department spends a great deal of time in studying the fuel situation, in testing devices for improving economy and in testing fuel and oil purchased by specification.

We believe it is essential that especial care and attention be taken in this matter of fuel economy. Throughout the year we average about 6.5 miles per gallon of gasoline. This figure takes into account all shrinkages, leakages and losses of every kind. There are a very large number of high individual averages, some as high as 15 miles per gallon. We have a number of men who can average 10 miles per gallon for a week at a time. High gasoline averages from our standpoint mean economy first, well

*Abstract of paper presented to the Society of Automotive Engineers, Ottawa Beach, Mich., June 23, 1920.

designed and maintained equipment second, and skilled and contented operatives. Gasoline is our second greatest item of expense. Our yearly bill is, in round figures, $700,000. Since 1 per cent of this amount represents $5,000 annually, it can readily be seen that losses of even 1 or 2 per cent must be remedied, regardless of whether these losses are due to mechanical or physical disabilities. Increased labor and material expenses, and gasoline falls under the latter head, cause us much greater anxiety than if we were manufacturing in the ordinary sense of the word, for we are selling a commodity which has a fixed price regardless of production costs. This means that every addition to our labor and material bill must be parallel with some form of economy. If this were not done we would soon find our expenses in excess of our income; for example, in 1911 our gasoline consumption averaged 2.9 miles per gallon and at that time gasoline cost much less than it does today, and if it had not been possible to increase our gasoline efficiency it is quite possible that the Fifth Avenue Coach Company would now be out of existence. Not only is our gasoline bill the second biggest item of expense but it is capable of greater reduction with less effort than any other single item. Our rising and falling gasoline averages are in effect the barometer on which we base our predictions. The gas barometer tells us in the most unmistakable language what is in store for us. Bad gasoline consumption means big fuel and repair bills, with the prospect of still bigger bills in the future; possibly also labor unrest, due to general dissatisfaction.

To attain high averages in fuel economy it necessarily follows that well designed and maintained equipment must be used. Our vehicles cover an average of more than 100 miles per day and are required to start and stop about 1,000 times each day, with several thousand gear changes, brake applications, etc. Furthermore, the vehicle is handled by several different drivers daily, so that none but the best material will stand up under such conditions.

Transportation Department

The superintendent of transportation has charge of selecting all men for the transportation department, supervision of their training, administration of discipline. elimination from service, promotion, general study of traffic conditions, collection of statistics from which running time and schedules are prepared, supervision of inspectional forces, receivers, timekeepers and mileage departments, division foremen, etc. In this work the superintendent has a supervising force of forty-five men, comprising foremen, heads of various departments, inspectors and starters.

The chief of the department bureau is responsible for all men employed. Applicants are generally recommended by employees and are principally married men, twenty-five years or over, and with army or navy training.

Applicants must be inspected for weight and height and all applicants are interviewed by an examiner, who questions them as to their previous experience. Those who qualify are permitted to fill out applications and are then passed on the the chief, who questions them further as to their general knowledge of the city. If accepted, the applicant is sent to the company doctor for physical examination and eyesight test. The applicant's references for five years are then investigated, and those references within 25 miles of New York city are checked up by a personal investigation. Only 20 per cent of all applicants qualify for positions.

Each applicant accepted is then sent to the conductors' school and given various forms of descriptive matter and instructed in detail on his duties. The applicants are assigned to conductor instructors on the road to receive practical working knowledge and then returned to the school for a final examination. Those passing the oral, blackboard and written examination with a proficiency of 75 per cent are recommended for appointment. Others receive further instruction until they are 75 per cent proficient. On an average the instruction period covers four days. After completion of the course the student is then outfitted by the company tailor and finally assigned to a division, where a get-together talk is given by the foreman. All new men are on probation for ninety days and during this time the chief conductor instructor rides with them as often as practicable for follow-up instructions.

The men who man our buses, including instructors, inspectors, starters, etc., must all graduate from positions as conductors.

Based on averages a conductor has an opportunity to become a driver after eight months' service. We attach great importance to the educational value of this position, for a driver without a conductor's experience can scarcely realize what a conductor must contend with and would be less likely to co-operate with the conductor. Promotion to driver involves an increase in pay of 13 per cent and is determined by seniority and operating record.

After passing another examination and being recommended by the foreman the drivers are sent to school to learn the duties they are required to perform. They are then shown on a stripped chassis the various units and the relation these units bear to the operation of the bus. They are then sent to a divisional instructor and receive practical experience in driving on the road without passengers. Upon passing the state examination and a license being granted, the student is permitted to drive a bus carrying passengers, under guidance of an instructor. He then is given a test by the chief driving instructor and if found stisfactory is assigned to a position as a regular driver.

On an average the instructional period covers sixteen days of ten hours each, the total of 160 hours being divided into forty-five hours of mechanical instruction, the same amount of driving instruction without passengers and seventy hours of driving instruction with passengers. From the time each man files his application for a position as conductor to the time he is made a driver the expense to the company for instruction is about $200.

Complete records are kept of each man. These are in folder form and consist of application, reference blanks, photographs, doctor's examination and certificate, complaints, violations, accident settlements.

When a conductor becomes a driver the same record is continued and there is attached thereto his record of instruction as a driver, the doctor's re-examination certificate and the employee's contract, also a sheet showing entries of all delays, together with a report covering their investigation. In the instructional period students are paid. It is in reality a loan, and a contract is made in which it is stipulated that if he remains as driver six months or longer the loan is discounted.

Buses are run in accordance with time-tables very similar to those of any steam railroad. The construc-

tion of our time-tables is a most difficult and expensive matter, much more so than with steam railroads and electric systems. Because of the varying traffic conditions along our routes, we are obliged to have no less than six different running times. Of course these are based on average conditions, since it would be impracticable to meet every variation. Any simplification of our time-table arrangements must immediately result in decreased speed, which would be unsatisfactory to the public and would be costly for us. Our annual payroll for drivers and conductors is in round figures $1,000,000, therefore a 1 per cent decrease in speed represents $10,000 added to our working expense. There are also schedule changes in the different seasons of the year and to take care of the various conditions of riding. This change in riding must be closely watched and passenger counts be taken at various points to determine just what service is necessary. Altogether there are ten time-table changes throughout the year and minor changes almost weekly.

There are nine separate lines in our system, all of which converge on Fifth Avenue below Fifty-seventh Street. At the different periods of the day we at present operate the following number of buses:

Period	Buses per hour	Headway, seconds
Morning rush	193	18
Mid-day	107	33
Evening rush	184	20
Sunday	144	25

Foremen, chief instructors, inspectors and starters patrol the routes for the purpose of regulating the operation of the buses and give follow-up instructions to new conductors and drivers. We also employ an average of twenty operatives in civilian clothes in our inspectional bureau to inspect general operations on the route. Inspectors make out hourly checks of schedules, report defective equipment and pavements, check conductors' register readings and talk to the men on minor violations. Serious infractions of rules are reported to the respective foremen of transportation and they in turn give the man four chances before sending him to the superintendent of transportation. We have also instituted the right of appeal, so that a man who feels an injustice has been done can take the case to the general manager and if necessary to the president.

Crews are allowed ten minutes each morning and night for an inspection of their buses. The depot dispatcher is responsible for seeing that the buses leave the garage on schedule time. As soon as a bus reaches the terminal it is under the direction of the starters and the inspectors, who direct the buses in accordance with schedules, which are provided in small book form.

Parades must be always looked out for. New routes must be selected and inspected for overhead obstructions, pavement conditions, etc.

We maintain a fleet of thirty-eight snowplows and five sand cars, with which we keep our routes open during the winter. The snow-fighting force is patterned after the fire department. Each section of our routes has its allotted plows, in charge of a captain, and our organization is arranged so that, regardless of the time of day or night a snowstorm starts, the required men automatically report for duty.

We have a sunshine nurse and sunshine committee to take care of those who are ill or in trouble, and in addition we maintain a pension fund. We often give free legal advice to our employees through our attorneys. Lunch and recreation rooms are maintained for employees at each garage, as well as barber and tailor shops, and the garages provide sleeping accommodations in the winter for men who cannot get home on account of unfavorable weather conditions, so that a man can practically live at the plant with all the various accommodations provided.

Future Possibilities of the Motor Bus

It has already been pointed out that motor bus operation is a comparatively new art. The possibilities of improvements are practically unlimited. This applies to design for greater comfort and convenience as well as to economy of operation. The bus requires a minimum investment in garage and repair facilities, and its low unit cost is a powerful argument in favor of its adoption. Unquestionably if a motor bus service is to realize its possibilities of financial success it must be backed up not only by ample resources but it must also develop a highly specialized organization. The engineering force and the management must have specialized experience, for the motor bus traffic demands are distinctly special.

Employees must be trained in a branch of motor vehicle operation with many distinct and unique peculiarities, for which the operation of neither the automobile nor any form of transportation affords suitable experience. One of the chief differences between the bus and other forms of transportation is the matter of flexibility. As a matter of fact we prefer to train men for drivers who have never had automobile driving experience. Furthermore, we find that railroad operatives, while they possess useful knowledge, must forget so much that on the whole it is more satisfactory to employ men without this experience.

In my opinion the wisest policy, both from a financial standpoint and the service results to the city, is to entrust a single, well organized and equipped company, possessing ample resources, with the development of a unified motor bus service. Parceling out streets to two or more companies will never provide the Pullman car service which the true motor bus can give. The actual result of any form of competition must be multiplied fares and no transfers. With a unified system there can be no harmful monopoly, for the fare should be determined by the authorities and the company should be under public regulation, but so-called competition from a public utilities standpoint means bad service and financial failure. Cities cannot be prosperous without efficient utilities and utilities cannot be efficient without prosperity.

No satisfactory motor bus service can be given with seats for all on the basis of the 5-cent fare. It costs the Fifth Avenue Coach Company about 8½ cents for each passenger carried. A large proportion of our daily mileage is operated at a loss. Checks show us exactly where these losses occur, but we do not try to avoid them, as we are satisfied that by careful management on the whole a profit can be made and we should lose if we cut service to suit local conditions.

We know our success depends on the good will of the public and it has always been our aim to give in exchange for our earnings an equivalent measure of helpful service.

Unquestionably in the large centers it is desirable that the workers should be able to get away from the busy centers of industry and into the more wholesome surroundings of outlying districts and everything should

be done by city authorities to encourage this. Nothing is of more importance in this respect than providing expeditious, healthy, comfortable and easy means of public conveyance to and from these districts, for of course the development of the outlying districts raises values, so that the city will in this way obtain increased income from taxation.

Clearly, where car tracks do not already exist, the most careful thought should be given before they are installed. Quite apart from this, from a public service as well as an operating point of view, there can be no question as to the possibility of using buses for (a) extending the service of existing car lines by bus system into the outlying districts through the introduction of transfer privileges between the two, (b) extending service, the conditions of the streets permitting, into the outlying districts without transfer service between buses and cars and without disturbing the present local business or business logical to the existing car lines, by permitting the buses to operate beyond the present outlying terminus of street cars and by diverting the buses to other parallel routes after reaching such outlying terminus.

In my judgment, no kind of bus designed up to the present is capable of properly handling peak loads. In my opinion the theory that the car systems in any of the larger cities can be supplanted by any standard size of bus now obtainable is absurd and not worth any serious discussion. No man with any elementary transportation knowledge would back such a statement. The bus is not more economical than the trolley car on the basis of cost per passenger carried, which is the only real basis. Obviously it is useless to compare the cost per mile of two vehicles with such vastly different seating capacity.

It should be borne in mind that the financial success of the Fifth Avenue Coach Company is largely due to the 10-cent fare. On a 5-cent basis its development would have been absolutely out of the question. The extra fare is willingly paid by the public to the bus company because of the greater ease and convenience of bus travel.

The policy of the Fifth Avenue Coach Company may be summed up in two words—"service and courtesy." From an inside viewpoint we try to give every member of our organization a square deal in all the word implies. With us the word justice is not merely an empty phrase. The "right of appeal" guarantees this. The doors of the executive offices are always open and the heads of the departments as well as the rank and file have free access at all times. Our staff officers are carefully trained and are taken into our confidence where matters of policy are involved and their views are eagerly sought. Our working conditions are just as good as we know how to make them. The net result is that labor troubles are conspicuous by their absence and practically every member of our staff has worked his way up from the ranks. Our organization is not a one-man proposition in any sense of the word, as each man is willing and anxious to do more than is expected of him and to subordinate his personal interest. We all believe in the theory and practice of teamwork, so it naturally follows that the operation of our business is extraordinarily free from petty jealousies and other forms of industrial unrest. We are extremely proud of our equipment and organization, with its personnel that knows not the word "failure." There is nothing at present to indicate any change in the future.

Buses Supplement Electric Railway

A FLEET of six motor buses and four trailers is being used by the Okmulgee (Okla.) Traction Company to supplement its regular railway service. Regular schedules are being maintained over two through routes which reach into all four parts of the city. Fifteen-minute service is maintained. The buses are operated on paved streets only, with the exception of special service furnished to the ball park when regular games are being played. Each of the routes reaches from 1½ miles to 2 miles from the center of the city.

For this service Oldsmobile trucks are being used. The cars are equipped with special bodies designed by M. M. Simons, general manager of the Okmulgee Traction Company, and built by the Lantz Carriage & Motor Works, Muskogee, Okla. The trailers are Trailmobiles. They are also equipped with specially designed bodies. The motor buses are of the one-man, pay-as-you-enter. type with the entrance at the front.



MOTOR BUS AND TRAILER USED BY OKMULGEE, OKLA, TRACTION COMPANY

They are equipped with electric bells, lights and heaters. The trailers are entered from the side. The motor buses have pneumatic tires, while the trailers have solid tires. The car and trailer combined seat forty-two persons. Their capacity in rush hours, however, is sixty persons. The fare is 10 cents cash, with three fares for 25 cents, and free transfers are given between routes. School children and school teachers are carried on special tickets for 5 cents each during the months schools are in session.

The Okmulgee Traction Company is still operating the full complement of electric railway cars, but it is said to be the intention of the company to abandon the railway, tear up the tracks and substitute a complete motor service if the present experiment with the buses proves successful.

Okmulgee is the county seat of one of the large agricultural and cattle growing counties of Oklahoma. It is also the center of a rich oil, coal and natural gas field, to which industries are being attracted by the enormous supply of all kinds of fuel which is available here. The gasoline with which the traction company's motor cars are driven is a product of one of the five big oil refineries located at Okmulgee.

The estimated production of bituminous coal in 1919 is 458,063,000 short tons. The amount of coal used by electric public utility plants during 1919 was 7.6 per cent of the total produced.

Coasting Recorders Give Striking Results

The Experience of One Year on the Lines of the Capital Traction Company Indicates Savings in All Directions—Transportation Department Must Take Active Interest to Realize Fully on Power Saving Installations

By J. E. HEBERLE
Assistant Secretary the Capital Traction Company, Washington, D. C.

NEXT to the cost of labor, the largest item of expense in the operation of a street railway company manufacturing its own power is the coal bill. Railways that purchase their power find this cost reflected in their power costs. With the constantly mounting price of coal, the importance of using every measure of economy is emphasized. One field of economy that deserves the attention of every railway man and that has been entered by a number of roads is the conservation of power through the installation of some one of the various forms of checking devices on the cars, recording or indicating the performance of each motorman, and accomplishing its purpose by a thorough follow-up system, including the instruction of trainmen in the most efficient and economical operation of their cars.

In 1919 the Capital Traction Company entered the ranks of companies which have adopted this measure as a means of increasing efficiency, and it is with the thought that our experience may be of interest and possible benefit to the industry at large that this article is written.

	Per Cent		Per Cent
June, 1919	28.1	December	32.1
July	30.0	January, 1920	32.1
August	30.6	February	31.8
September	30.6	March	35.0
October	30.5	April	35.7
November	31.8	May	36.5

The necessity of conserving coal, both as a patriotic measure during the war and as a means of economy, was recognized, and in 1918 an order was placed with the Railway Improvement Company for coasting recorders to equip all of our cars. The skip-stop system had been instituted in April, 1918, on the railway lines in the District of Columbia, and in August our schedules were revised and tightened up to absorb the slack occasioned by the new stop system. The coasting recorders were installed in the spring of 1919 and the entire system was equipped by June 1.

Briefly stated, our first year's operation with the recorders resulted in an increase in our coasting percentage of about 15 per cent and an estimated saving in fuel and brake shoes alone of $36,717. This was accomplished with an investment of $38,852 and an expense of $7,913, giving a net return in twelve months of $28,804, or 78 per cent of the outlay for recorders. At present our net saving in coal and brake shoes is approximately $3,600 per month. Other benefits accruing are touched on later.

Improvement in Coasting

Our first week of operation with the recorders showed a coasting average for the system of 26.4 per cent. This was after the initial instruction and after several lines had been operating with the recorders for from two to three weeks. From the first few days' performance of each division we estimate that our coasting percentage prior to the recorder installation was approximately 20 per cent. The system coasting percentages for each month from June, 1919, to May, 1920, inclusive were as shown in the table in the first column.

The building up of our coasting to 30 per cent offered no particular difficulties, the issuing of general instructions, posting weekly and monthly lists at the division barns showing the individual coasting records and periodic visits of the coasting instructor readily bringing this percentage. It required more strenuous measures to reach a higher mark. Starting with the last week of October, 1919, an intensive coasting campaign was inaugurated, with 35 per cent set as the goal. Coasting was "sold" to every member of the transportation department and the aid of the mechanical department was enlisted to see that the cars were maintained in good rolling condition. Our motormen so entered into the spirit of the campaign that they reached the coveted 35 per cent in March, 1920, increasing this to 36.5 per cent in May.

The individual records in the early period showed a vast range, some motormen having records as low as 8 per cent. A surprising feature was that many of the low records were turned in by men who in all other respects were excellent motormen. An idea of the improvement in this respect may be gained from the following table, showing the number of our men with various coasting percentages during the week ended June 7, 1919, and the last week of May, 1920:

	Percentages of Total Motormen Weeks Ended	
Motormen with Records of	June 7, 1919	May 28, 1920
10 to 15 per cent	4.2 per cent	....
15 to 20	18.1	....
20 to 25	28.7	....
25 to 30	22.8	4.8 per cent
30 to 35	11.4	34.2
35 to 40	7.8	38.7
40 and over	7.0	22.3

It will be noted that the first week our system was fully equipped, which represented a better condition than before the coasting clocks were installed, 73.8 per cent of our motormen coasted less than 30 per cent, compared with 4.8 per cent during the week ended May 28, 1920.

Effect of Increased Coasting on Kilowatt-Hours per Car-Mile

Beginning with the first month the recorders were in operation a marked reduction in kilowatt-hours per car-mile became apparent. This is best shown by the following table, giving kilowatt-hours generated per car-mile operated for two years prior to the installation of recorders and one year with the coasting recorders

in use. The figures in italics represent the mean temperature for each month, obtained from the Weather Bureau.

KILOWATT-HOURS PER CAR-MILE

	Without Recorders 1917–18	Without Recorders 1918–19	With Recorders 1919–20	Percentage Reduction 1919-20 vs. 1918–19	1919–20 Coasting, Per Cent
June	3.45	3.59	3.25	9.3	28.1
	78	*71*	*74*		
July	3.33	3.49	3.15	10.2	30.0
	77	*74*	*77*		
August	3.27	3.42	3.14	8.2	30.6
	76	*78*	*74*		
September	3.50	3.49	3.23	7.6	30.6
	64	*64*	*69*		
October	3.63	3.57	3.26	8.7	30.5
	52	*61*	*63*		
November	3.97	3.67	3.265	10.9	31.8
	43	*46*	*47*		
December	4.29	4.02	3.59	10.7	32.1
	28	*42*	*33*		
January	4.60	4.12	3.799	7.9	32.1
	24	*38*	*29*		
February	4.22	4.22	3.82	9.6	31.8
	37	*37*	*33*		
March	3.84	3.84	3.37	12.3	35.0
	48	*46*	*46*		
April	3.77	3.72	3.20	14.0	35.7
	53	*54*	*53*		
May	3.55	3.50	3.09	13.8	36.5
	70	*65*	*60*		

A detailed study made over two comparative periods, one preceding and the other subsequent to the installation of coasting recorders, showed that a greater proportionate reduction in kilowatt-hours occurred at the time of peak load than occurred during the non-rush period.

Savings Effected

The results of the reduction in power demand for car operation, both in kilowatt-hours and equivalent coal value, are shown in the following table:

	1919-20 Versus 1918-19 Increase in Car-Mileage Operated		Increase in Kw.-Hr. Generated		Saving, Kw.-Hr.	1919–20 Fuel Value
June, 1919	81,496	11.6%	29,923	1.2%	261,987	$2,219
July	94,400	12.9	42,017	1.6	295,665	2,540
August	106,275	14.7	130,673	5.3	233,628	2,000
September	117,135	17.0	194,293	8.1	214,361	1,828
October	159,234	23.3	306,412	12.6	262,043	2,233
November	92,896	13.2	20,967	0.8	319,540	2,636
December	106,538	14.6	67,759	2.3	360,774	3,070
January, 1920	85,012	11.9	79,390	2.6	269,158	2,261
February	86,907	12.8	56,837	2.0	306,072	2,562
March	111,881	14.8	17,483	0.6	412,785	3,802
April	72,902	9.6	161,614*	5.7*	463,689	4,516
May	32,758	4.1	229,424*	8.2*	403,815	4,050
Totals	1,147,434		554,916		3,803,517	$33,717

* Denotes decrease.

Our coasting campaign has had the effect of increasing the life of brake shoes from an average of 459 miles over a five-year period previous to the installation of recorders to an average of 699 miles during the past twelve months, or 52 per cent. The gross saving in brake shoes during the year of operation with the coasting recorders was approximately $3,000, making a total gross saving in coal and brake shoes of $36,717. The total cost of operating the recorders for the year was $7,913.

Accompanying the saving in brake shoes was unquestionably a reduction in wheel wear, which should be reflected in a greater life of car wheels. As the average life of car wheels is from two to five years, we are not able at this time to approximate the amount of this saving. Other equipment economies were undoubtedly effected, due to less wear and tear resulting from increased coasting, but these are not of a measurable nature.

The average cost per motorman of operating the recorders was $23.62 per year, divided as follows:

Coasting instructor	$6.25
Recorder maintainer	5.42
Office employees	9.10
Paper tape for recorders	1.63
Envelopes and office supplies	.85
Recorder repair parts	.37
Total expense	$23.62 per annum
Fuel and brake shoe savings	109.60 per annum
Net saving per motorman	$85.98 per annum

We have 317 cars equipped with coasting recorders and the average number of motormen's records handled per day is at present 350. The operating force consists of one coasting instructor, one recorder maintainer, two clerks employed full time on detail record work and one clerk in charge of the record work, who devotes about one-half time to duties unrelated to coasting recorders.

Effect on Collisions

A close and continued study has been made to ascertain what effect a coasting campaign has on collisions, which has shown conclusively that such a campaign is not detrimental. Of the motormen involved in collisions during the first five months of 1920 63 per cent had coasting records below their division average. The total number of collisions of cars with persons, cars and vehicles during the first five months of 1920 showed a decrease of about 20 per cent over the corresponding periods of 1918 and 1919.

Other Benefits

Coasting records have been of considerable value in furnishing an additional vehicle for conveying to the management the relative efficiency and value of motormen. The economic value of coasting having been established, new light is thrown on the individual operating efficiency of motormen formerly classed as "good" motormen. We believe the effect of our coasting campaign has been beneficial in improving the general morale of our trainmen. We have been able to maintain a better inspection of our car equipment through following up claims of motormen that they were handicapped in their efforts to coast by cars not working properly. The recorders clearly demonstrated the economy of replacing trucks on thirty of our cars, and this work is now being carried out.

General

The ultimate success or failure of any form of power-saving device installed on the cars depends on the amount of interest displayed, particularly by the transportation department. We have established a fair coasting average as one of the requirements of the work of motormen. This standard must of necessity be flexible to fit the various individuals. The time of the coasting instructor is entirely devoted to instructing motormen who have not reached or who have fallen below this standard, and this instruction is almost invariably followed by an improvement. Our experience has been that a coasting campaign does not go very far of its own momentum, but requires constant attention from responsible officials, and the results are well worth the effort required.

An investigation, in co-operation with the National Electric Light Association, of the fundamental principles of inductive interference between power and telephone lines is under consideration by the United States Bureau of Standards. The bureau has not yet determined whether it could undertake such an investigation.

Federal Report Nearing Completion

Meeting of the Federal Electric Railway Commission Was Held on Thursday to Consider Final Draft

THE members of the Federal Electric Railway Commission met in Washington on Thursday, July 22, at the call of Chairman Elmquist to consider a draft of the report to be presented to the President. At the close of the meeting it was announced that it will be several days before the commission will have its report completed. The report will be submitted to the President before it is made public.

It will be remembered that the commission conducted a series of hearings last summer and fall on the electric railway situation. The first hearing was held in New York on June 19. All the other hearings were held in Washington, the last being in October. Altogether the hearings consumed twenty-eight days and more than a hundred witnesses presented testimony. In addition, a series of 174 questions was sent to mayors, chambers of commerce, boards of trade, central labor unions and state public utility commissions to obtain their views on the electric railway situation.

Shortly after the close of the open sessions the commission employed Dr. Delos F. Wilcox to assist the commission by making an analysis of the evidence presented. Originally it was expected that Dr. Wilcox could finish this analysis by Dec. 1. After getting into the work, however, and realizing the vast amount of evidence dealing with all phases of the question which had to be analyzed he saw that in order to make a report which he would consider worth while it would require a great deal more time. Accordingly, about the last of November he put the matter before the chairman of the commission, who authorized the enlargement of the scope of his analysis and the taking of whatever further time was necessary.

The task of studying the evidence relating to almost every possible phase of this question and covering the entire United States, as well as of digesting and analyzing all of this evidence, was such that with the meager help obtainable with the small appropriation of $10,000 it was found not possible by Dr. Wilcox and the secretary of the commission, Charlton Ogburn, who assisted Dr. Wilcox, to finish the analysis before the end of May. As completed the analysis of the testimony covers about 800 printed pages and is divided into chapters dealing with the following subjects:

The street railway an essential public industry.
Restoration of electric railway credit a fundamental necessity.
Fundamental importance of labor as a factor in street railway operations.
Credit and co-operation the co-ordinate needs of the electric railways.
Conditions in electric railway operation normally favorable to credit.
Conflicting evidence as to amount of new capital required annually in the electric railway industry.
Amount of new capital requirements not clearly shown, but necessity for restoration of credit proven.
Why has electric railway credit been lost?
Overcapitalization a cause of the failure of credit.
Neglect to amortize excess capitalization:
Failure to amortize normal accrued depreciation.
Payment of unearned dividends and neglect of ordinary maintenance.
Overbuilding.
Holding companies and banker control.
The uniform 5-cent fare.
Special taxation and franchise obligations.
Use of police power to compel more and better service.
Public regulation of stock and bond issues.
Shares of companies and public in responsibility for loss of credit.
Effect of automobile and jitney competition on credit.
Increasing demands of labor.
The war and the dollar.
How can credit be restored?
The pros and cons of public ownership.
Public co-operation and a new deal required.
Increase in margin available for capital.
Double purpose of unit fare increases.
Effect of fare increases upon traffic and revenues.
Table I—Analysis of traffic showing relation of revenue passengers to fare increases.
Table II—Analysis of gross passenger revenue showing relation of passenger revenue to fare increases.
Table III—Revenue passengers carried on principal urban street railway systems for the first six months of 1917, 1918 and 1919.
Table IV—Comparative summary of passenger revenues in relation to fare increases.
Table V—Comparative summary of traffic data in relation to fare increases.
Table VI—General summary of analysis of effect of fare increases upon traffic and revenues.
The zone fare or distance tariff.
Relief from taxation and other public burdens.
Efficiency in management and economies in operation.
Control or abolishment of jitney competition.
Co-operative relations between management and men.
Public subsidies.
Abandonment of unprofitable lines.
Financial reorganization.
No one remedy sufficient.
The valuation.
The rate of return.
Unrestricted state regulation.
Service at cost.
The use of public credit.
The electric railway labor problem.
Labor's public relations recognized.
Limitation of "The Right to Strike."
The program of the Amalgamated.
Labor's participation in management.
Electric railway employees as civil servants.
Service versus profits.
The four choices.
Abandonment of public interest no remedy.
Commission regulation not adequate as a solution of the problem.
Where "service at cost" falls short.
Public ownership and operation the ultimate solution.

One of the time-consuming parts of the work was the tabulation and then analysis of the traffic figures, *i.e.*, the number of revenue passengers and the amount of passenger revenue of virtually every company in the United States, month by month, for a period of three years. Special attention was given in this analysis to any factors, such as competition, strikes, and fare increases, which had a tendency to affect the volume of traffic, thus establishing a number of interesting relations.

Changes in Retail Prices of Food

THE cost of twenty-two articles making up the retail food index carried on by the Bureau of Labor Statistics of the United States Department of Labor attained a new high record in May. The increase on May 15 was 3 per cent over April 15 and 7 per cent over January 15, 1920. These increases are mainly accounted for by the great price increases of sugar, flour and potatoes. The cost of this food budget in May, 1920, had advanced 17 per cent over May, 1919, and 123 per cent over May, 1913. In June there was a further increase, the average family expenditure for these articles being 2 per cent higher on June 15 than on May 15. Figures by cities showed for the period increases in thirty-nine cities and decreases in twelve cities. Prices of food articles are reported to the Bureau of Labor Statistics every month by retail dealers in fifty-one important cities.

Letters to the Editors

July 10 Issue Is Commended

Letters from Manager, Manufacturer and Operative Present Different Points of View

Many complimentary letters have been received by the editors in regard to the issue of July 10. From them three typical communications, each representing a reader in a different group, have been selected and are printed below. The names of the authors are omitted, as the letters seem to have been written as personal communications and not primarily for publication.

Wants More of the Same Kind

July 16, 1920.

To the Editors:

Allow me to express my appreciation of the JOURNAL of July 10. Without any question it is the best issue I have ever read.

Although our troubles have been many and various, ranging from strikes to jitneys, we have always taken the position that the street railway industry was in the very nature of things bound to prosper. Urban transportation is absolutely essential to our modern civilization, and we have always felt that what was essential in this world would be supported. I am sure what we need now is more of the kind of stuff you gave us in the July 10 issue. "GENERAL MANAGER."

Thinks Business Men Fight Unfair Competition

July 16, 1920.

To the Editors:

I have just finished reading your issue of July 10, which is a splendid number and should accomplish a great deal of good in the industry. I cannot agree in every respect, however, with the sentiments expressed by "Engineer," who writes under the title of "Sell What the Public Wants." For example, in one place "Engineer" says:

> Success in an industry depends, outside of indomitable courage and unflagging energy, upon the production at a reasonable cost of an article which the public wants, either through a natural or a created desire, and upon merchandising that article so that it is kept sufficiently attractive to the public to insure that it is demanded in such amounts and ways as to make its sale profitable. And, incidentally, the wise merchant brings out the shortcomings of his competitor, not by direct attack, which always breeds a sort of sympathy for the object of that attack, but by setting up the virtues of his product in such a way that the comparison is sure to be made by the desired customer.

Now, the comparison drawn, though ingenious, is not an accurate presentation of the facts. In the first place, in practically no industry except the utilities is the sale price fixed by law, with no reference to the cost of production. What the average business man would do under such condition would be to get out of that kind of business and start in some other that is not so restricted.

A great many railway executives have, of course, been guilty of the things set forth in this article in that they have tried to destroy their competitor—the jitney—by legal restraints on the grounds of unfairness, etc. But it is not a fact to say that other business men do not resort to this sort of thing. Most of them, if they see a competitor using unfair methods, will do everything possible to stop it. The Federal Trade Board has been established for that very purpose, and if "Engineer" would review the complaints placed before this board by business men trying to curb the unfair practices of their competitors, he would find that the railway men have company in indulging in this sort of complaint.

On the other hand, "Engineer" is correct in that a great many railways have done nothing except make complaint, while other business men do resort to the things that "Engineer" sets forth.

"MANUFACTURER."

Let the Operatives Help

To the Editors:

Your article, "The Coaches Can't Do It All," in the July 10 number is to the point, but how many of the employees know the facts or understand them? I have often seen articles that have brought this same thought to me. The platform men in particular could do an inestimable amount of good, as they are the ones who meet the public and they are the ones who get the kicks. To say that the platform men get a thousand complaints to every one that goes to the office would, I think, be putting it mildly. And when the employee is not informed in regard to the facts and the reasons he will probably sympathize with the public, and this will make matters worse than they were before.

It is well worth while to educate the employees for their own good so that they may realize their duty more strongly, but when they are taught to become salesmen and representatives of the company a good job is done.

I suppose that where there are company sections of the A. E. R. A. this is done to quite an extent, but such companies are too few. If the company is not in a position to have an employees' club it might at least have the ELECTRIC RAILWAY JOURNAL and even other trade papers, such as the *General Electric Review*, on the table in the swing room so that the men could get the facts first hand. They are interested, I know, from their willingness to borrow my copies of the JOURNAL, and many of them are more than surprised when they find out that there are hundreds of companies in the country that are in the same position as their own.

Some companies, I know, have company papers, but the men are apt to think these are cut and dried—prepared for the purpose. They don't begin to know what a job the railways are up against. They think that if their run pays a few dollars more than platform expenses the road must be paying dividends. Officials should get the men posted and keep them so if they want to get in touch with the public. "CONDUCTOR."

Electric Welding of Rail Joints

ROBERT W. HUNT & COMPANY, ENGINEERS
CHICAGO, July 19, 1920.

To the Editors:

Your editorial in the issue of July 3 entitled "Making the Life of the Joint Equal that of the Rail" touches on a very important matter seemingly deserving of comprehensive study by the Electric Railway Association's track committee of the American Electric Railway Engineering Association. There is no doubt but that the electric welding of rail joints has been an efficient means of combating some of the troubles of bolted or riveted joints, but failures of them have occurred after comparatively little service. Considerable progress has

been made in recent years with bolted or riveted joints, to which the use of oil-quenched and possibly heat-treated materials have contributed. Cast-welded joints constitute what may be termed the third type of rail connection that should be included in an investigation of the whole subject. Original costs are exceedingly pertinent today, but should by no means influence, to the exclusion of other details, the question of what type of joint to use.

Defects, of course, may develop in any type of joint. Thus, bolts may stretch due to their low elastic limit. Electric welding of high carbon rails may produce such a change of structure in the steel as to reduce its normal ductility and resistance to impact. Rails after some years' service in cast-welded joints have shown a very appreciable deterioration due to moisture seepage, and mechanical looseness has resulted.

What constitutes the best type of joint is a question fraught with many difficulties, and the time is ripe for a thorough study and discussion of all the facts and experiences. C. W. GENNET, JR.

Desirability of Commutation Tickets

BROOKLYN, N. Y., July 14, 1920.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL dated June 26, 1920, you have an article on page 1291 entitled "Are Commutation Tickets Desirable?" in which you criticise a part of the report of the committee on public utilities on electric railway service in Camden, N. J. You seem to belittle the advantages to the railroad of wholesaling tickets. Personally, I believe it to be quite the reverse, especially when you consider the fact that most railroads selling commutation tickets allow thirty round trips per month, to be used only during that month, and only by the purchaser; also I believe some roads even have each ticket dated so that a passenger may ride "to and fro" only once per day. In numerous cases I know that passengers rarely use all their book of tickets during the month, and if there are any left, due to sickness or otherwise, they cannot be redeemed.

Furthermore, the commuters are the ones who make the traffic, because they ride regularly, their riding can even be counted on in advance. If it wasn't for the commutation traffic the passenger returns, I dare say, would not amount to very much.

The reduction in rate, even if small, and especially the fifty-trip ticket plan, that any member of the family may use, encourages riding, is convenient and means a certain good will among patrons, which is a thing not to be shunned nowadays. Taking it all in all, I don't think commutation tickets are such a losing proposition as you make it appear.

Further on in your article you lead your readers to believe that steam railroad commutation is less expensive to the railroad than electric commutation, due, as you say, principally to the fact that the steam coaches may be stored in a terminal during the day. You, of course, may have a specific case in mind, but you speak generally, and I should therefore like to know why an electric road cannot store its cars in a terminal also, as a good many electric lines running to suburban towns operate multiple-unit trains and have terminals located at their extremities, according to various articles that I have read from time to time in the ELECTRIC RAILWAY JOURNAL.

I should think that it would be much easier and economical for the electric road, inasmuch as it would require the switching facilities at the terminal necessary for the steam road, due to the fact that on the electric lines most of the cars are equipped with motors. From an operating standpoint the electric road must certainly be the cheaper. Not only is it possible to operate the electric car or train where and under conditions that would prohibit the steam locomotive, but it can also follow the traffic more closely, due to the ability to operate single-car units, or trains of any desired length, whereas the steam locomotive could not be operated alone, but must haul its tender and one car, anyway.

Another thing which ought to enable the electric railway to compete in rates with the steam road is the fact that the electric road, as a rule, does not offer the accommodations, such as upholstered seats, smoking compartments, lavatory facilities, etc.; neither is the riding usually as comfortable, due to the steam road's heavier equipment and better kept right of way. Then you finish by saying that there is no reason for an electric railway to reduce its fares during rush hours in order to get peak-load business. I don't think they should either; that is, any more reason than why a steam road should.

I should think, in conclusion, that as railroads in general claim there is no money made in passenger traffic alone they would try to develop enough riding so that it would pay, and I believe commutation tickets is a step toward that result. HENRY B. DROWNE.

Burning Tie Rod Holes in Rails

CHICAGO & JOLIET ELECTRIC RAILWAY
JOLIET, ILL., July 19, 1920.

To the Editors:

I noticed an article on page 908 of your issue of May 1, 1920, regarding the burning of tie rod holes in rails. We are doing a considerable amount of work similar to this, and while I think the idea is rather absurd that these holes damage the rail to the extent of causing it to break, I would like, if possible, to know what experience other companies have had in this connection.

The web of the rail is subject to such a small amount of the stresses in the rail that I do not see where burning holes through the web very seriously affects the strength of the rail. It is true that the burning of holes may have more serious effect than drilling, due to the heating of the metal around the hole, which may cause additional stresses to be set up. But this heating is over such a small area outside of the hole that even if the entire area heated is considered damaged, still I cannot see how the strength of the rail is damaged to such an extent as to cause it to break.

I would appreciate very much any additional information you can give me. JOHN B. TINNON,
Engineer Maintenance of Way.

(Note: We have received several letters similar to the above, seeking further information on the results that may be expected by this method of making tie rod holes. The economy of this practice makes it very attractive, but the experience of the company, as noted in the article referred to above, gives a doubtful aspect to this economy. In view of the general interest in the subject, we would welcome correspondence from other companies giving their experience along this line.—EDITORS.)

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Detroit Case Carried Up

Company Still Fighting—City Going Ahead with Its Municipal Railway Plans

The petition of the Detroit (Mich.) United Railway for permission to carry the judge's ruling to the United States Supreme Court was granted by Judge Arthur J. Tuttle after a ruling had been handed down dismissing the action in equity of the company against the city of Detroit. The action against the city followed the municipal bond election, the company charging that ballots of illegal type were used in the election.

COMPANY HAS LEGISLATED RIGHTS

The company sought by the action to stay the city from constructing lines provided for by the bond issue that was voted, or from interfering with the construction program of the Detroit United Railway.

It was held by the judge that the Detroit United Railway enjoys no contract rights through the lapse of time on day-to-day agreement, but has only those which have been actually legislated.

The City Council has asked the Street Railway Commission for a written report stating its reasons for not permitting the Detroit United Railway to finish the St. Jean Avenue line, one of the so-called day-to-day agreement lines. This line was started by the company last spring, but construction work was stopped by the police under the direction of the city officials.

Councilman Bradley, who instigated the Council's action, gave two reasons for making the motion. The line, he stated, was badly needed and he had been unable to understand why the city had allowed the Detroit United Railway to complete the Twelfth Street line but had halted work on the St. Jean line.

FUNDS FOR MUNICIPAL LINE

It was asserted that the Detroit United Railway alone was to be blamed for the fact that the line was not being completed, for if the company would sign an agreement to waive legal claims to rights in the streets, it would be permitted to finish the line at any time. It was also pointed out that the company allowed a year and a half to elapse after the Council had granted it permission to construct the line.

Authorization of the sale of $700,000 of the public utility bonds provided for at the April 5 bond election will soon be asked by the commission to furnish money to pay for the construction work and buy rails and ties for the first 30 miles of the municipal lines.

Approximately $1,400,000 in contracts have been let on the work for which plans have been drawn by the commission's engineers, and the $700,000 will bring the total of bonds offered for sale up to $1,000,000. No large amount has been sold to the public or to any one outside of the city itself. The first $100,000 issue authorized was purchased by the city Treasurer out of the city's "invested funds." The second issue of $200,000 was sold to the sinking fund commission at par and accrued interest.

Receivers Increase Wages

New York Railways and Brooklyn Rapid Transit Give Men Wage Increase of 10 per Cent

The operating force of the New York Railways, or approximately 3,500 persons, received on July 18 an increase in wages of 10 per cent. This agreement will run until Dec. 31, 1921. It will increase the operating expenses about $500,000 a year. The increase was allowed by Job E. Hedges, receiver of the company, with the approval of Federal Judge Mayer. Twenty-one representatives of the Brotherhood of New York Railways employees were parties to the agreement.

Lindley M. Garrison, receiver of the Brooklyn Rapid Transit System, also has announced a similar increase to take effect on Aug. 6, 1920. At the same time H. Hobart Porter, vice-president and general manager of the Brooklyn City Railroad, authorized wage increases by the same amount.

The present increases in New York and Brooklyn are the third since the companies passed into the hands of a receiver. They aggregate 35 per cent. The New York Railways is not making any money, and in order to meet this added expense it is probable that an increase in fare will have to be made. An 8-cent fare has been suggested.

Under the new rates the wages of motormen and conductors on the New York Railways will range between 57 and 67 cents an hour, according to the length of service; substation operators from 71 to 94 cents, machinists from 40 to 70 cents, cable riggers from 48 to 71 cents, storage battery motormen 53 to 62 cents, and other workmen in proportion. Ten hours is to be considered a day's work, with time and a half for all overtime.

The shopmen of the Brooklyn Rapid Transit are understood to have rejected the company's offer. It is said that they will demand an increase of 25 per cent over present rates. The trainmen were considering the wage offer as the ELECTRIC RAILWAY JOURNAL went to press.

Duluth Service Suspended

Men Quit When City Council Refuses to Heed Their Appeal for Fare Relief

Service on the lines of the Duluth (Minn.) Street Railway was virtually at a standstill on July 21. Following the sudden walkout of employees, not a wheel turned until 10.30 a.m. and then only one crew went out. Full service was resumed the following day, however, when the men accepted the proposition of the City Council for a second referendum election on the 6-cent fare.

COUNCIL REJECTED FARE APPEAL

The strike was precipitated by the refusal of the City Council to introduce or consider the 6-cent fare ordinance presented by the employees of the company, who urged that it should be passed in order that their wages might be raised. A strike vote was taken on July 20, the polls closing at 9 p.m. The vote was 383 for a strike on July 28, and fifty-three to initiate a referendum petition. When the report was read later to the mass meeting of the employees, calls for an immediate strike were made.

No formal vote was taken then, but it was so agreed, although Herbert Warren, general manager of the railway, who attended the meeting, urged the men to keep their heads and not strike. He said the company was entirely unprepared for a strike and that while strike-breakers probably would not be ordered, an effort would be made to re-establish service.

There was no disorder during the time service was suspended. Special policemen and deputy sheriffs were stationed at the carhouses. The strike did not affect service on the Superior lines of the Duluth-Superior Traction Company, which controls the Duluth Street Railway. The cars in Superior ran as far as the Interstate Bridge.

ANOTHER ELECTION LIKELY

The City Commissioners indicated late on July 21 that steps would be taken at the meeting of the Council on July 26 to call another referendum election. Three of the five Commissioners present at the meeting on July 21 favored this plan. The company officials said if the ordinance was carried at the second election an increase in pay of 20 per cent as demanded by the employees would become effective, retroactive to July 1. Representatives of the employees who attended the conference at the City Hall indicated that if this was done the men would be persuaded to return to work immediately.

At the open conference on July 12 President Robertson explained the situation which now confronts the company. He said, among other things:

We cannot pay any increase in wages without an increase in fare. We are up against a stone wall. We simply haven't the money. The election showed that 6,000 of the citizens of Duluth are with us for an increased fare. We must not make threats or do anything that will cause them to lose the confidence they have shown in us. By the terms of our franchise from the city we are under a contract to provide street car service. If the worst comes to the worst—I want to make the matter clear as to our duty and not by any suggestion or threat—if the worst comes to the worst, and you gentlemen decide to strike, the company officials will go to the limit of their ability to keep the cars running. We realize that you men are entitled to more money, that you need it, and we are trying to point out the way by which we hope to be placed in a position so we can give it to you. Six hundred votes the other way at the election would have carried the ordinance we desired. I feel that if we could have said to you that we could grant an increase in wages if the fare ordinance carried there would have been more work done in behalf of the passage of the ordinance. But we could not say that. We are prohibited by the corrupt practices act of the state.

Mr. Doherty Appeals to Courts

Wants Toledo Restrained from Voting on Traction Settlement at Election on Aug. 10

Toledo may not get a chance to vote on the two municipal ownership ordinances which were drawn up by a commission appointed by Judge Killits, passed twice by Council and referred to the people for ratification. The measures providing for $7,000,000 were to go to a vote at the primary election on Aug. 10. On July 17 a bill of complaint was filed in the federal court at Toledo by Henry L. Doherty seeking to restrain the board of elections from submitting the ordinances. The case will now have to be heard in federal court. If Mr. Doherty's contentions are upheld the measures are dead for all time.

THE case is one of the most unique in the history of the Toledo traction disputes. The Toledo Traction, Light & Power Company, a holding company chartered in Maine, which owns bonds of the Toledo Railways & Light Company, has sued the county board of elections. The city is not made a party to the suit. The prosecuting attorney of the county must fight the legal battles of the board of elections.

City Not Included in Suit

The elimination of the city entirely from the suit also eliminates its legal facilities from the fight which may be made against the granting of the injunction. However, Mayor Cornell Schreiber's first impulse was to ask the court that the city be made a party to the suit.

The bill recites the history of the present trouble beginning with the passage of the ouster ordinance last November and the consequent return of the cars under the joint protection of the federal court and a repeal of the ouster by Council. It outlines the plan agreed to for a settlement, but declares that the municipal ownership commission has "utterly failed to perform its function and duty of preparing a plan for acquiring or constructing a street railway system in the city of Toledo."

City Bonded for $7,000,000

The two ordinances bonding the city for $7,000,000—one for $3,000,000 for acquiring a transportation system and the other for $4,000,000 for constructing a transportation system—it is contended "do not designate what kind of a transportation system is to be acquired or constructed and do not contain any plan or suggestion with reference to where or what said transportation system shall be, or how same shall be acquired, constructed or operated."

It is pointed out that the service-at-cost ordinance which was intended to be presented to the people at the same election as the municipal ownership ordinance is now in the hands of Council with a valuation not agreed to by Henry L. Doherty. But it also charges that Council has taken no step toward negotiating a settlement of this one remaining difficulty and that should the municipal ownership measures go to a vote the people would not "have the opportunity to express their opinion as between the proposition to bond the city for $7,000,000 to be expended in some unknown way for some unknown system of transportation and the granting of a franchise for the operation of the street railway system in the city upon the service-at-cost plan."

Ordinance Attacked

The legality of the ordinance is also attacked. Section 121 of the City Charter is quoted and it is alleged that it was never complied with in the passage of the bond ordinances. This section provides that before an issue of bonds may be authorized the director of finance shall furnish to the Mayor, Council and publicity and efficiency commission a statement showing the condition of the city's bonded debt. The finance director is said to have made no such report and the company claims that the bonded debt of the city is now many millions of dollars.

It is shown that the Rail-Light now owns property for taxation in Toledo of a value of $13,700,000, of which more than $11,000,000 is real estate and $2,600,000 personal property, and that the company is now paying more than 3 per cent of all the taxes collected in the city of Toledo.

On this premise it is claimed that the passage of the ordinances calling for heavy bond issues for no specific purpose would cast a "cloud" upon the title of the property of the Rail-Light against which there are mortgages to secure the bonds held by the petitioning company.

The net earnings of the traction company now are declared to be inadequate to pay the interest on the bonds and provide the fair return to the capital invested. If taxes were increased the earnings would become so low as to impair the financial stability of the company. The holding company has pledged the Rail-Light bonds as collateral for $10,000,000 of notes which will mature on Dec. 1, 1921, and it is claimed that any cloud on the title of the property would make the difficulty of renewing or refunding these notes very expensive.

Company Makes Declaration

The bill claims that there is "design" in the submission of the ordinance which provides for $3,000,000 of bonds to acquire a transportation system. It outlines the plan which has been put forth by the advocates of municipal ownership—that of condemning the paying lines of the Rail-Light and ordering others to be torn up and removed from the city.

In its petition the company declares:

Upon information and belief the plaintiff avers that the plan to submit the ordinance to the electors is but one step in the consummation of the wrongful and inequitable design and purposes aforesaid to ruin and destroy the property of the Toledo Railways & Light Company, and that should said purpose and design be carried out the security for the payment of the bonds owned by the plaintiff would be greatly reduced and impaired in an amount which the plaintiff cannot at this time calculate.

The two bond issues are $5,999,000 of 5 per cent first mortgage gold bonds of the Toledo Traction Company and $6,000,000 of 5 per cent first mortgage gold bonds of the Toledo Railways & Light Company.

Mr. Doherty declared that he felt it his duty to "save the people of Toledo from the enactment of a farce election seeking only to delay a permanent settlement of the street railway situation."

Judge Killits has been spending a vacation in northern Ontario. He did not intend to be in the city till Sept. 1, but has wired that he would come home to hear the case in court on July 22. Notice was served on Prosecuting Attorney Seney that the hearing would be held at this time.

If the injunctional relief asked for is allowed the ordinances providing for municipal ownership of "a transportation system" will never be submitted for a referendum vote.

Memphis Men Prepare New Scale

Preparation of a new wage scale for submission to the Memphis (Tenn.) Street Railway is being considered by the motormen and conductors. The present agreement with the company expires on Aug. 1. Both sides are said to have expressed themselves as prepared to arbitrate in the event the first scale is not accepted. Wages now range from 42 to 48 cents an hour. The maximum is paid to men who have been with the company for a period of eighteen months or more.

Service Resumed in Akron

Five-Cent Fare for Sixty Days Pending Permanent Settlement Basis —Wage Controversy Under Way Four Months

At a special meeting of the City Council of Akron, Ohio, on the afternoon of July 16, it was decided to amend the franchise of the Northern Ohio Traction & Light Company in such a manner as to allow the company to collect a straight fare of 5 cents for sixty days, with the idea that a permanent agreement on the rate of fare could be reached within that period. If this is found impossible, the time may be extended.

A. C. BLINN, general manager of the company, at once notified William Lemmon, business agent of the union, that the men would be granted the increase in wages allowed by the board of arbitration immediately on their return to work. Cars were put into operation the following morning, although many of the men were out of the city and it was thought that several days would elapse before the service would be complete.

Only One Vote Against

Gus Kasch was the only member of Council who voted against the amendment increasing the rate of fare. He declared that the Car Riders' League had not been informed of the movement to increase the fare and that none of its officers had been invited to the Council meeting. City Manager William J. Laub, who is president of the league, however, was privileged to be present at all meetings. Mr. Kasch threatened to invoke the referendum and expressed the belief that the recall might be exercised with reference to some of the members.

The controversy between the company and its men has been under way for four months. The men submitted a demand before the expiration of their contract on May 1 for a wage of 80 cents an hour with an eight-hour day. The company replied that this was more than could be paid and the matter was taken to arbitration. Based upon the condition that the company be allowed a rate of fare that would cover the increase, the board of arbitration awarded the men a wage of 65 cents an hour. Employees then notified the company that they would remain at work twenty-one days, in order that some agreement for an increase of fare might be reached with the city. Many conferences followed, but failure resulted in each attempt to reach an agreement. The men extended this period, however, because the last day fell on July 4, but left their cars on July 6.

Union Considers Matter Ended

Officials of the union stated that the matter is ended as far as they are concerned, since the company has agreed to pay the wage awarded by the board of arbitration. It is understood that they will be given back pay from May 1.

Provisions in regard to transfers are to remain as they have been. Those who have tickets under the old rate may have their money refunded by returning the tickets to the office or the holders may add 1 cent to each ticket and tender the ticket and the coin in payment of fare.

The following statement was made by the public utilities committee of the City Council:

As a result of wage differences between the company and its employees, the city, although not a party to the controversy, was drawn by arbitrators into the unfortunate situation where an award of increase in wage was made conditioned upon the city granting to the company a higher rate of fare.

A threat made by the men to leave their cars unless the higher wage was paid by the company was carried out, leaving the public without transportation.

The company then pressed on Council a request, first for a 7.4-cent fare and then for a 6-cent fare to meet the emergency that had thus been created.

While Council was in sympathy with the request of the employees for an increased wage, it was out of accord with both the manner of involving the city in the dispute and the high fare requested by the company.

Feeling satisfied that a 5-cent cash fare would provide the company with sufficient additional revenue to meet the wage increase, this offer was made the company.

It was refused and the city began suit to enforce its contract with the company and compel a resumption of car service.

Convinced that the public demands not only better service, but extensions to lines, negotiations had been taken up with the company in the meantime with a view of obtaining for the city a new contract in which such benefits could be secured.

Progress along these lines had been made.

Further, being satisfied that a new contract can be drawn within sixty days that will provide for better service and extensions, giving at the same time a large measure of supervision and control of operation by the city, we agreed to recommend to Council that a 5-cent cash fare be granted the company during the period for further negotiation and on the condition that resumption of service begin at once. The offer was accepted by the company.

That the public has been liberal in its views, patient and good natured, and has made no complaint about the situation which had arisen and over which the city had no control, has aided very much in bringing the matter to so early a settlement.

At Massillon, where the company operates a local line, the City Council has passed an ordinance increasing the rate of fare from 5 to 8 cents. It provides that the company must station four watchmen at the railroad crossings in the city, build new tracks on Akron street, put on two daily cars between Massillon and Cleveland and provide for a special service between Massillon and Meyer's lake. The company agreed to place fifteen new cars in operation there when the ordinance went into effect on July 15.

Threatened Strike in Buffalo

The employees of the International Railway, Buffalo, N. Y., have asked for increased wages and a closed shop policy. The company has refused to grant either request, claiming that 60 cents an hour is an adequate wage. The dispute has gone to a board of arbitrators after several threats of a strike. On July 17 the men voted to put off indefinitely the calling of a strike, but gave their executive committee the power to act if it considered a strike necessary.

C. J. Joyce, Philadelphia, is the arbitrator appointed by the company and James H. Vahey the arbitrator appointed by the men. These two have agreed to the appointment of a third arbitrator by Governor Smith in the event a Public Service Commissioner will not serve.

In a statement to the men given to the press, President Tulley of the company said:

The International Railway increased the wages of its men 12 cents an hour, from 48 cents to 60 cents, effective on May 1, 1920. The cost of this advance approximates $1,000,000 a year. The car fare was simultaneously increased from 5 cents to 7 cents, which is producing increased revenue of less than $900,000 a year.

In granting the 12 cents increase the company has, therefore, already given the men more than the entire amount received by the company from the increase of from 5 cents to 7 cents in car fares, and can grant no further increase in wages without a corresponding increase in car fares.

East St. Louis Wages Advanced

The arbitration board appointed to settle disputes between the East St. Louis & Suburban Railway, East St. Louis, Ill., and its employees recently awarded the men increases ranging from 40 to 52 per cent. Conductors and motormen will receive an increase from 46, 48 and 51 cents an hour to 70 cents an hour, shop men from 48 cents to 63 cents an hour, and extras will be guaranteed $80 to $90 a month. The working day was fixed at nine and one-half hours, with time and a half for overtime. The new rates are effective May 1, 1920. The employees asked for a maximum of 87.5 cents an hour and an eight-hour day. They have voted to accept the award.

The award will affect about 310 men. It will mean an increase in the yearly payroll of approximately $250,000. The present East St. Louis fare is 6 cents and an application is pending before the Illinois Public Utilities Commission for an increase to 8 cents to meet the 12 per cent increase in wages allowed a year ago by the War Labor Board. In order to meet this last award officers of the company estimate it will require an increase in fares to 10 cents or more.

C. E. Smith, representing the railway, in the course of a long dissenting opinion, said:

I was favorable from the very start to a reasonable increase and so stated, but I could not sign the award of the two other arbitrators, as the company's financial statements clearly showed that it could not pay any additional wages without increasing fares more than was necessary with past wages. I was unwilling to place upon the public the burden of paying the abnormally increased fares that will be necessary to give such an unfair and unreasonable increase in wages, especially at a time when all serious-minded men are engaged in efforts to reduce rather than to increase those expenditures that contribute directly and indirectly to the high cost of living.

It is an amazing fact that the chairman, a graduate of a reputable state university, a member of the Illinois bar, practicing with fellow members of the bar, should, when entrusted with such an important case as this, render a decision not substantiated by the record, entirely outside of and beyond the evidence and without ad-

vancing, in the deliberations of the board, a single fact or argument to substantiate his decision.

There is no recourse left the company except to petition the Public Utilities Commission for permission to raise its fares sufficiently to meet the increase of more than 40 per cent in its payroll and to secure a reasonable return on the fair value of its property. If the commission does not grant such rates or if, having been granted, the public refuses to ride and adopts other means of conveyance, the result, to the company, to the industries and to the community, will be disastrous.

The wage demands of the men on the Alton city line and on the single-track suburban lines remain to be arbitrated. The Alton men are being paid from 46 to 51 cents. They are demanding 92.5 cents an hour. The interurban men are getting 48 to 53 cents and demand 95 cents an hour.

Staten Island Case Decided

Federal Judge Thomas J. Chatfield, in Brooklyn, on July 14, handed down a decision upholding the right of the city authorities of New York to declare the franchises of the Richmond Light & Railroad Company forfeited in view of the failure of the company to live up to contract obligations. In his decision, Judge Chatfield said:

The Court of Appeals seems to hold that the action of the Board of Estimate in declaring by the passage of a resolution that a charter has been revoked is action of a legislative nature.

The decision of the Court of Appeals is controlling over the present application in this respect, and it must be held that this court has no authority to determine whether the passage of a resolution forfeiting a charter is purely an executive act like the canceling of a contract by a single official involving possible judicial determination.

The court, therefore, cannot grant the motion to enjoin the Board of Estimate from considering and passing a resolution declaring the franchises forfeited, and the temporary injunction order must be vacated.

Under the decision of the Circuit Court of Appeals in the Manhattan & Queens Traction corporation case this court has no right to determine collaterally that the city of New York, through its Board of Estimate, might be acting with no foundation of law and entirely outside its authority in declaring the franchise in question forfeited, if the Board of Estimate should see fit, acting under the advice of its legal representative, to attempt to pass such a resolution. But no individual employee or agent of the city, even if a resolution of forfeiture should be adopted, can, under the general injunction, proceed to interfere with the operation of the receiver before this court has an opportunity to pass upon the validity of the resolution in question.

Under the circumstances now set forth in the present case, the restraining order should be continued and the injunction applied for granted to the extent of specifically forbidding any physical interference with the operation of the receiver or any attempted action under or enforcement of the resolution declaring the franchises forfeited if the threatened action be taken until application has been made to this court for an order vacating the injunction forbidding such action.

Municipal Men Want $6 a Day

A group of employees of the San Francisco (Cal.) Municipal Railway appeared before Timothy A. Reardon, president of the Board of Public Works, on July 14, and demanded an increase in pay of from $5 to $6 per day. Mr. Reardon told the committee that such an increase at this time is impossible, as the lines are now showing a deficit. Following the refusal of Mr. Reardon to grant the increase, the spokesman for the men announced that he would appear before the Board of Supervisors and demand that the wages of the men be raised to meet their request.

Service Being Restored

New Orleans Company Re-establishing Schedule—Court Will Not Be Intimidated or Coerced

The car strike situation at New Orleans, La., remains practically unchanged. Transportation facilities, however, are resuming normal slowly. The recent outstanding event was the submission on July 15 by Receiver O'Keefe to a committee representing the strikers of a form of contract he is willing to sign. Receiver O'Keefe recognizes the right of collective bargaining, the right of employees to be represented by officers and committees of their choosing. He stands for promotion according to seniority and ability with no discrimination against union men or the men engaged in the present strike. Wages will be left to arbitration, but will be raised only as fare increases granted by the Commission Council of the city provide revenue for the increases.

THERE is no recognition for the Amalgamated Association, although the right of employees to membership in the Amalgamated Association is not denied. Some of the men in the Amalgamated had advanced as a reason for their refusing to relinquish membership in the association the fact that they were insured under the Amalgamated auspices. In consequence of this the receiver offered a better insurance inducement than the men now hold under the Amalgamated membership.

Judge Rufus E. Foster of the United States District Court has issued the following statement in regard to the strike:

I notice the statement from J. B. Lawson, national executive officer of the Amalgamated Association, that the real question now is whether the company will renew the old contract with the understanding that the wage scale will be arbitrated.

The issue goes far beyond this. The Constitution of the United States guarantees liberty of contract to all men. Every man has the right to belong to a labor union, or to remain out of it, or to withdraw from one after he has joined. The receiver also has the right to contract with an association in which he has confidence and not to contract with an association he believes to be arbitrary and unfair in its demands.

The old contract referred to by Mr. Lawson has many objectionable features, apparent on simple reading, to any fair-minded man. The receiver has found it impracticable to operate the property to the best interests of the public under its terms and conditions. He is willing to enter into a contract with his former employees collectively, provided the contract is entirely removed from control of the Amalgamated Association.

The order of court I issued when it became apparent to me that it was impossible for the receiver and the representatives of the Amalgamated to agree on a contract which gives the men everything they could fairly expect under a contract. It provides for collective bargaining, representation through committees of their own choosing and arbitration of wages. The men could return to work under its provisions without affecting their union affiliation in the least.

The real question now at issue is, are the courts of the United States to be governed by the Constitution and laws of the United States in their decisions or be subjected to dictation from any organized group of men. This question is fundamental and paramount and superior to any temporary inconvenience the public may suffer, regrettable though that may be.

I will not be intimidated or coerced in deciding this question by sympathetic strikes or political clamor. I expect all good citizens of New Orleans, whether laborer or capitalist or that vast majority which falls into neither class, to support the courts of the United States. A proper decision of the question is vital to the very existence of our government.

The differences of the contending parties are being aired in page advertisements in the local papers. On Sunday morning the men announced that they were firmly resolved to maintain relations between the Amalgamated Association and through this association their affiliation with the American Federation of Labor. This step apparently blocks all avenues to a reconciliation.

The matter of wages and hours of labor which precipitated the trouble are now forgotten in the fight for recognition of the union. There have been but few disturbances on the cars growing out of the strike, and violators of the federal court's order that the employees of the company must not be molested have had swift and summary justice meted out to them. Varying periods of imprisonment in the various parish (county) jails of the State have been given them. None has been sentenced to the New Orleans parish prison, where they could be seen and visited by their New Orleans friends, relatives and sympathizers. They have been scattered all over the State, one strike sympathizer, in particular, having earned the distinction of drawing a year and a day sentence in the federal penitentiary at Atlanta.

The allied unions have refused to go on a sympathetic strike, but promise moral support and advocate the advisability of operating a jitney service, in opposition to the car company, the funds derived therefrom to be used in aid of the striking car men. The union representatives also asked that Judge Foster remove the deputy United States marshals that man the cars now and that he also modify his court order permitting the receiver to contract with them through the Amalgamated Association.

The men have also enlisted the aid of both representatives of the New Orleans District in Congress, who have been interceding with Judge Foster. To all of these appeals the court has turned a deaf ear and refuses to allow the receiver to contract with the Amalgamated Association, in any form, though the men may contract with the receiver as a local union and still retain membership in the Amalgamated Association.

Mayor Martin Behrman filed a petition on July 20 in the U. S. District Court asking Judge Foster to permit the city to intervene in the receivership proceedings and to consent to a modification of the court's order whereby the only obstacle to a settlement of the strike—recognition of the Amalgamated Association—may be removed. The Mayor's action was based upon a resolution adopted by the Commission Council. The court consented to hear the petition, but no date was set. If the appeal is granted the strike may be ended at once. The court had not acted up to July 22.

Chicago Car Strike Ends

Men Gain Unionization of South Shops and Abolition of Piece Work, but Wages Are Those Offered Before Strike Was Called

The strike of the substation operators formed the crippling blow in a walkout of some 300 employees of the Chicago Surface Lines on the morning of July 13. The employees who ceased work included the shopmen employed at the South Side shops, the linemen and later the trackmen and West Side shopmen in addition to the substation operators. The strike was called by the notorious "Umbrella" Mike Boyle, the issue being primarily that the company would not concede a closed shop at the South Side shops, which have always been operated as non-union with a large amount of the work done on a piece-work basis.

AS WAS noted in the telegraphic report of this strike which appeared in last week's issue of the ELECTRIC RAILWAY JOURNAL, the company had made an offer of liberal increases to the various crafts, but Mike Boyle staked everything on his determination to make the company grant a closed shop. Public opinion was thus aroused against the strikers and the company was fixed in its purpose to operate the cars despite the strikers.

SERVICE QUICKLY RESTORED

The strike began early Thursday morning and by Saturday sufficient substations had been manned so that normal service during non-rush hours was provided and about 50 per cent of rush-hour service. By Sunday practically normal service was being operated. The result was that at 4:45 o'clock Sunday afternoon Boyle and the other union heads, in the offices of the company, where they had earlier announced they would not appear for a conference, reached an agreement which ended the strike.

According to the terms of this agreement, the wages settled upon are practically those offered as the men went out. The South Side shops formed the bone of contention in the strike. They will be unionized, though on the open shop principle, thus placing these shops on the same basis as has applied to the West Side shops for years.

Work in the South Side shops was transferred from a piece-work basis to an eight-hour day basis, the hours to be equalized within the next ninety days. The result of this is that many of the men will now receive about $1 a day less than they have been earning on the piece-work basis. This peculiar angle of the strike is better understood by the knowledge that most of the men were very well satisfied with the piece-work system and were finally induced to strike only through intimidation.

SHOPS ON EQUAL BASIS

Overtime in both South and West Side shops was put on an equal basis, time and one-half. Trackmen and machinists were placed on the same ratio of pay, but a raise to 70 cents an hour asked is still under consideration.

The union heads were defeated on their demand for an increase for the two groups of Class B electricians to a standard rate of pay. The same was true of the tinners. Their wages will remain as heretofore.

Metal workers received an increase of 5 cents an hour on night shifts. Blacksmiths gained nothing by the strike. Helpers in these trades will receive 80 cents an hour instead of the 97½ cents demanded. Trackmen under the new schedule will be paid 54 cents an hour. Pavers will get 68 and 70 cents an hour, depending upon their length of employment. Workers in these trades employed in the shops will receive the same rate of pay as those outside. The rates offered by the company of $9 a day for linemen, $7 a day for helpers and $10 a day for foremen were accepted.

Substation men were given $120 a month during the first year of employment, $125 during the second, $130 for the third and $145 for the fourth. Operators will get $200 and $210, the same figure offered by the company before the strike, while the union demands were $225. The rainy day clause demanded by the linemen also was lost. It was disregarded in the settlement.

ELEVATED LINES NOT AFFECTED

An interesting sidelight on the strike was that the similar employees of the elevated system, who are unionized, were not called out by the union officials. The trainmen of both the surface and elevated lines have always worked in union in making their demands. The trainmen of the surface lines did not join in any way in the recent strike. The company paid them for full time for reporting and waiting in readiness to take cars out as rapidly as substations could be operated. The fact that the trainmen only recently received a handsome increase and signed a new contract with excellent feeling prevailing undoubtedly had much to do with their lack of sympathetic interest in the recent strike.

During the strike of the surface lines, the elevated lines put all of the cars available in operation in order to handle the enormous crowds which swarmed the elevated platforms.

Wage Jurisdiction Waived

Colorado Industrial Commission Declines to Exercise Jurisdiction in Denver Tramway Wage Case

On the grounds that its recommendations of May 10 have been totally ignored by the city authorities, and that it is therefore not for the best interests of the parties to the controversy nor of any advantage to the public that hearings or investigations be held, the Industrial Commission of the State of Colorado has declined to assume jurisdiction over the pending wage demands upon the Denver (Col.) Tramway by the local branch of the Amalgamated Association.

The employes were awarded an increase of 10 cents an hour by a local board of arbitration on March 18, which through inadequacy of revenues the company is unable to pay. Announcement by the company of contemplated reduction in wages and restoration of the National War Labor Board scales formerly in effect resulted in the Industrial Commission taking jurisdiction over the controversy. After investigating the matter the commission issued its findings and order on May 10, which substantiated in every detail the claims of the company and recommended

> that the proper local authorities at once fix and establish a fair rate for the services rendered to the public by the Denver Tramway. Such rate, in order to provide revenues with which to pay the wages fixed by the arbitration board in its decision of March 18, cannot be, at this time, less than 7 cents for adult fares and 3½ cents for half fare.

The City Council ignored the recommendations of the Industrial Commission and without making an investigation in its own behalf refused to pass a 7-cent fare measure which had been initiated by the company.

COMPANY MUST CONTINUE

Through a temporary injunction granted by the District Court upon the application of the city of Denver, the tramway is literally compelled to continue in force the wage scales established by the arbitration board, at least until decision is rendered by the Colorado Supreme Court, which has now assumed jurisdiction over the injunction case.

The pending demands of the union are for a wage scale for trainmen of 70 cents the first three months, 73 cents the next nine months and 75 cents thereafter, with corresponding increases for employees in other departments. In ruling on this case the Industrial Commission in its order of July 15 said:

> It now appears to this commission that its recommendations "that the proper local authorities at once fix and establish a fair rate for the services rendered to the public by said Denver Tramway Company" have been wholly ignored and said Denver Tramway is now operating upon the same fare as existed at the time of said award on May 10, 1920; that there has been no change in other conditions affecting the revenue and necessary expenditures of said Denver Tramway sufficient to alter or modify the said findings and award of said commission; that this commission has not investigated the question of a fair wage to said employees under present living conditions; that the ability of the said company to pay wages under a 6-cent fare and present conditions has been investigated by this commission as above set forth; that one of the primary objects of investigations by this commission of industrial controversies is conciliation between the parties and the discovery of a common ground upon which a settlement can voluntarily be made. In this case the difficulty between the employer and employee is not entirely the inability of the parties to reach an agreement upon the question of a fair wage, but the dispute arises over the inability of the parties to adjust for the employees a fair wage compatible with the ability of the company to meet such wage. The ability of the company to pay is not within the control of either party hereto nor this commission, but in the rate-fixing power of the public officers charged with that responsibility. Said company has refused to agree to the payment of a wage beyond its ability.

Six-Day Week Suggested

Plans Fast Being Lined Up for Thorough Inquiry at the Twin Cities

A six-day week has been suggested by a member of the Minneapolis arbitration board which is considering demands of the trainmen of the Minneapolis Street Railway for increased wages and an eight-hour day. The trainmen have postponed a referendum on this point until they learn what will be the status of their demands already before the board.

MANY TRAINMEN NEEDED

H. W. Ralph of the company's schedule department said it will require 14 per cent increase in number of trainmen. The plan was proposed because it was found that at $150 apiece to teach new men to operate cars there is a heavy expense due to the turnover in men.

The board held its first meeting July 7 to listen to replies to questions asked H. B. Warren, who is studying the company's financial statement for the board. Milo R. Maltbie, New York, is expected to arrive on July 19 to aid in the investigation.

The company reports that operating expenses in Minneapolis in May were $51,480 lower than the average for four months preceding. A net balance is shown for the St. Paul system of $25,586, offsetting a deficit for four months and leaving a five months' balance of $9,149. Reduction in payrolls, because not enough men could be had to man cars, is one reason for the increase in revenue. The St. Paul operating expense for May was $49,926 lower than the average for four months.

Byron Gifford, Grand Rapids, Mich., has been selected by the City Council of Minneapolis, Minn., to audit the books of the Minneapolis Street Railway. The purpose is to get a report on which the Council can base action if it finds that an increase in fare from 5 cents is necessary to permit the company to pay increased wages demanded by the trainmen. Mr. Gifford's staff of five assistants is headed by G. H. Mathews, chief statistician for the Wisconsin Railroad Commission. A specific report is not expected before Aug. 2.

EXPERTS AT WORK

H. B. Warren, local expert, is continuing his investigation to answer questions proposed by the arbitration board. Milo Roy Maltbie will go over the Warren figures for the board. The board expert is to determine what it will cost to put the Minneapolis service back to the standard of 1917.

In St. Paul Dr. E. W. Bemis, Chicago, has been retained to make a revaluation of the property of the St. Paul City Railway. There a similar arbitration board is endeavoring to determine whether St. Paul can allow the company an increased fare.

The Twin City Rapid Transit Company has asked for a 7-cent fare with four tickets for a quarter.

News Notes

Dissatisfied with Street Railway Service.—Since the railway service in Windsor has been taken over by the Ontario Power Commission, great dissatisfaction has been felt by the patrons of the Sandwich, Windsor & Amherstburg Railway. It is claimed that the service is inadequate and that municipal operation does not meet the needs of the people.

Municipal Operation of Bridge Cars.—The Board of Aldermen of New York has authorized Grover A. Whalen, Commissioner of Plant and Structures, to purchase without public letting the cars and equipment necessary for the city to operate the electric railway shuttle service over the Williamsburg Bridge after he has the necessary funds to carry out the plan.

Company Accepts Winnipeg Award.—The Winnipeg (Man.) Electric Railway will accept the award of the Myers board of arbitration granting the men a 10 per cent increase in wages. The acceptance of this award will mean an additional $300,000 in wages. The award has not, as yet, been accepted by the men, who had asked for practically a 50 per cent increase over present wages.

Platform Men at Columbus Refused Increase.—The Columbus Railway, Power & Light Company, Columbus, Ohio, has refused the demand of the motormen and conductors for an increase of 50 per cent in wages. In a statement issued by the company it was explained that no increase can be granted at this time. The men were scheduled to meet on July 13 to discuss the company's reply.

Road Unable to Purchase Cars.—Ralph Peters, president of the Long Island Railroad, in a statement replying to the order of the Public Service Commission requiring the company to buy 100 new cars, says that, under present conditions, the road is unable to purchase the cars, and that an increase of fares is the only solution. Mr. Peters says that the cars will cost $3,000,000 and that capital for them cannot be secured.

Preparing for Arbitration at Dayton.—The local branch of the street railway men's union at Dayton, Ohio, has selected J. E. Duncan, secretary-treasurer of Typographical Union No. 57, as its member of the board of arbitration to fix a permanent wage scale. The company officials are to name a second member and these two will agree upon a third, if possible. If they fail the third member will be selected by the State Industrial Commission.

Bus Franchise Forfeited.—An ordinance to repeal the fifteen-year franchise granted to the General Omnibus Company to operate in Newark, N. J., has been ordered by the City Commission of Newark. The franchise was issued Feb. 19, 1919. The company was given a year to begin operations, and the extension on that time has now expired.

White Plague Exhibit Car.—The Tuberculosis Society of St. Louis, Mo., has fitted up a public health street car to educate the public in the fight against tuberculosis. The car contains exhibits showing the effects of the disease and simple measures to be taken to prevent its spread. During a recent week 12,000 people visited the exhibits and 40,000 pieces of literature were distributed.

Wage Terms in Strike Settlement.—The strike of the employees of the Jersey Central Traction Company, Keyport, N. J., which began on June 26, has been settled and service has been resumed. The new agreement provides for added compensation for the men, but the company refused to recognize the union. Seniority rights were also granted which give the men the privilege of selecting their runs. The new scale provides for the payment of 46 cents an hour for the first nine months, with 48 cents for the remaining three months of the year. After a year of service the pay is 50 cents. Under the old scale the men were paid 41 cents an hour for the first nine months, 43 the next three and 45 cents after a year.

Philadelphia Men Forego Wage Increase.—More than 10,000 employees of the Phildelphia Rapid Transit Company on July 22 voted not to demand payment of their increase in wages of approximately 7½ cents an hour granted on June 1 until the company's revenue increases sufficiently to pay the advance. The action was taken after Thomas E. Mitten, president of the company, had outlined to a meeting of employees' representatives the financial condition of the company and said it could not pay the increased wages until additional revenue was obtained. Application has been made to the Public Service Commission for the abolition of free transfers, which Mr. Mitten estimated would increase the company's yearly revenue about $3,000,000. Under an agreement between the company and the men the wages are based on the average compensation paid electric railway employees in Chicago, Detroit, Cleveland and Buffalo. Wage increases granted in Detroit on May 16 and in Chicago June 1 necessitated under the agreement a wage increase by the Philadelphia company of from 65 cents an hour to 72½ cents.

Program of Meeting

Illinois Electric Railway Association

The mid-summer meeting and golf tournament of the Illinois Electric Railway Association will be held at Springfield on July 30.

Financial and Corporate

Mr. Stotesbury Resigns from P. R. T.

He and Two Other Banking Members of the Board Retire After Losing Fare Vote

E. T. Stotesbury, Horatio G. Lloyd and C. S. W. Packard all resigned as directors of the Philadelphia Rapid Transit Company at a meeting on July 19. They retired following the voting down of a proposal made by Mr. Stotesbury for a flat 7-cent fare. The other directors voted to withhold acceptance of resignations until the bankers had had an opportunity to reconsider their resignations if they desired to do so.

ANOTHER significant development at the meeting was the passing of the dividend. It was announced that the semi-annual dividend would be deferred because of lack of funds. A statement given out later said that it had been necessary to appropriate earnings for the first six months to meet expenditures and that as a result no action was possible in the direction of a dividend.

All accounts of the meeting seem to indicate that the breach between Mr. Mitten and Mr. Stotesbury has been widened and that there is little prospect of the chairman and the president of the company being able to reconcile their conflicting views on fare matters. It was over this question that the differences came about. At the meeting three different elements were represented: First, there were the bankers, led by Mr. Stotesbury; then came the stockholders, led by Mr. Mitten, and, third, the three city representatives, headed by the Mayor.

As soon as the matter of the dividend had been disposed of, Mr. Stotesbury, as chairman, passed on to the subject of fares. Mr. Lloyd, vice-president of Drexel & Company and the associate of Mr. Stotesbury in that firm, discussed the finances of the company and the fare proposition. He stated that the present application for higher fares on file by Mr. Mitten with the Public Service Commission was inadequate to provide for the financial needs of the company. This proposal provides for the abolition of free transfers and the curtailment of the 3-cent exchange in the downtown business district. It has been estimated that these changes would increase the revenue of the company $3,000,000 a year.

Mr. Lloyd moved the Mitten plan for higher fares be immediately withdrawn. In its stead he proposed that the company apply for a flat fare of 7 cents, with the understanding that the company issue rebate tickets for the 2-cent additional fare, so that the refund could be made at a future date if the fare increase were rejected by the Public Service Commission. In addition he proposed that the new fare increase be put into effect with the understanding that an appraisal of the company's property be presented to the city not later than Sept. 1. He maintained that the appraisal would justify the increase to 7 cents.

Mr. Mitten opposed this plan. He declared that the $3,000,000 revenue that would be received under his proposition would be sufficient to defray the operating costs and provide for the dividend.

Mr. Lloyd's plan, when put to a vote, was lost, six to five. The directors who defeated Mr. Lloyd's motion were Mr. Mitten, Mr. Moore, Col. Sheldon Potter, Ernest T. Trigg, William J. Montgomery and J. J. Sullivan, Jr. The resignations of the directors previously mentioned were then presented.

The company, in announcing its abandonment of the dividend for the first time in three and a half years, made public figures that indicate that the earnings up to date are $367,899 short of the amount needed to pay the dividend and meet the wage adjustments that are necessary. The figures of earnings are reproduced elsewhere on this page.

Mr. Stotesbury said that as soon as he was fully convinced that he should make a statement it would be forthcoming. He is quoted as follows:

> I will answer no questions, so there is no use asking any. I am still considering the proposition of issuing a statement setting forth my ideas on transit matters.

Mr. Packard said:

> I resigned. I did not tender my resignation. I can say the directors who resigned did not represent large holders of stock, but they did represent other interests that are large stockholders. That is all for the present. Anything else must come from Mr. Stotesbury.

In connection with the resignations it is now recalled that last February the voting trust expired which had been in operation for ten years. During the life of the voting trust Mr. Stotesbury was all powerful. Mr. Mitten seemingly considered the fare matter an operating problem. On the other hand, Mr. Stotesbury looked upon the fare readjustment as a matter of financial consideration, subject to action by the directors before any steps were taken by the operating committee.

A statement made by Mr. Mitten follows:

> The car riders of Philadelphia may rest assured that the management will continue to function to the very best of its ability. The record of achievement by the Mitten management in overcoming obstacles stands as an unmistakable index to the completion of the program adopted by the management.

STATEMENT OF EARNINGS OF PHILADELPHIA RAPID TRANSIT COMPANY

June:		1920	1919
Operating revenue		$3,177,848	$2,963,631
Operation and taxes		2,358,336	1,907,465
Operating income		$819,511	$1,056,166
Non-operating income		53,590	33,991
Gross income		$873,102	$1,090,157
Fixed charges		816,444	808,156
Net income		$56,658	$282,001
Amount necessary to meet June 1 wage adjustment	$187,500		
5 per cent return on P. R. T. paid in capital—one month	125,000	312,500	
Amount by which gross revenues are insufficient to provide for operating expenses, taxes, fixed charges, and the 5 per cent return upon P. R. T. stock		$255,841	

Six months ended June 30:		1920	1919
Operating revenue		$18,653,593	$17,174,965
Operation and taxes		13,436,291	11,709,077
Operating income		$5,217,301	$5,465,888
Non-operating income		251,901	264,513
Gross income		$5,469,203	$5,730,402
Fixed charges		4,899,602	4,853,801
Net income		$569,600	$876,600
Amount necessary to meet June 1 wage adjustment	$187,500		
5 per cent return on P. R. T. paid in capital—six months	750,000	937,500	
Amount by which gross revenues are insufficient to provide for operating expenses, taxes, fixed charges, and the 5 per cent return upon P. R. T. stock		$367,899	

Ordinance Allowances Increased

Board of Arbitration at Youngstown Increases Awards for Operating Expenses and Maintenance

The Youngstown (Ohio) Municipal Railway, the operating subsidiary of the Pennsylvania-Ohio Electric Company for the Youngstown, Ohio, city lines, recently found it necessary to submit to arbitration the matter of an increase in the allowances for operating expenses and maintenance under the terms of the service-at-cost franchise in effect there. This was referred to at length in the ELECTRIC RAILWAY JOURNAL for June 19, page 1277.

The board of arbitration, of which Col. J. H. Alexander, vice-president Cleveland Railway, was the company's member, after full consideration reached the decision whereby the operating allowance of the company was increased from 27 cents to 34 cents per

car-mile for all cars equipped with motors and 60 per cent of this sum for trail cars. In addition to this flat rate, the award provides that the sum of 0.8 cents per car-mile shall be added for each $1 by which the average cost of coal per ton delivered to the North Avenue power house of the company shall exceed $5 per ton. In other words, if the average cost of coal per ton is $5.50 during any month the operating cost allowance per car-mile for that month would be increased by 0.4 cent, making the total operating allowance 34.4 cents per car-mile.

Company Protected by Compromise

The decision as to the allowance for maintenance, repairs and renewals increases the sum from 8 cents per car-mile for motor cars and 60 per cent of this amount for trail cars to 9 cents per car-mile.

During the proceedings the company asked for an operating allowance of 36 cents per car-mile and a maintenance allowance of 11 cents per car-mile. The operating allowance of 34 cents with an adjustment for the price of coal over $5 is practically the same as 36 cents.

Dividend Vote in August

Referendum Likely on Increase in Dividend of Cleveland Railway to 7 per Cent

The Supreme Court of Ohio on July 16 ruled that the case of Edwin D. Barry, who sought to prevent a referendum vote on the ordinance increasing the dividend rate of Cleveland Electric Railway stockholders from 6 to 7 per cent, was of wide public interest, but that, since there was no error intervening, a hearing must be refused. Unless some other step is taken, the referendum vote on the ordinance will be taken at the August primaries.

When the employees of the company were granted an increase in wages several months ago, the company asked for an increase in dividends to stockholders on the ground that many of them needed the additional 1 per cent as much as the employees needed the increased wage. Council granted this in an ordinance. Petitions for a referendum were circulated. Mr. Barry, a stockholder, brought suit for an injunction on the ground that the number of names on the petition was not sufficient. The case was decided in his favor in Common Pleas Court.

Second Suit Started

New names were secured to the petition and a second suit was filed by Mr. Barry for an injunction on the ground that the time for filing petitions had expired. This time the case was heard before Judge Thomas in Common Pleas Court. He decided in favor of the city. An appeal was taken to the Appellate Court, where the decision was sustained. From this tribunal the case was taken to the Supreme Court.

Financial News Notes

Walla Walla Lines Suspend.—Two lines of the Walla Walla (Wash.) Valley Railway, the Prospect Heights and East Walla Walla branches, have been discontinued. The lines have not paid expenses for several years.

Service Resumed to Squantum.—Regular car service was resumed on July 1 by the Eastern Massachusetts Street Railway between Squantum and Atlantic after one year's absence of cars on this line. The operation was discontinued more than a year ago because the Squantum line was unable to meet expenses and the City Council of Quincy was not willing to bear so great a burden.

Guelph Road Taken Over.—The Ontario Hydro Power Commission took over the Guelph (Ont.) Radial Railway on July 1. W. W. Pope, secretary to the commission, says that application has been made to the Lieutenant Governor-in-Council for permission to run the road and that arrangements have been made for disposing of $150,000 of bonds, representing the purchase price of the road.

Mayor Asks Appropriation for Hyde Park Operation.—Mayor Peters has requested the City Council for an appropriation of $30,000 to be paid by the city to the Boston (Mass.) Elevated Railway under the authority of the special legislation act for the public operation of street cars in this district. The accompanying order provided that the $30,000 be raised by taxation in the city of Boston.

New Springfield Issue Approved.—The Department of Public Utilities of Massachusetts has authorized the Springfield Street Railway to issue twenty-year mortgage bonds to the amount of $2,954,000, with interest not to exceed 7 per cent. The use of $2,230,000 is approved for paying, refunding or retiring three loans maturing within three years, and balance for working capital, additions and betterments. The program of the company for carrying out local improvements has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Common Stock Dividend Reduced.—The American Light & Traction Company, New York, N. Y., has declared a quarterly cash dividend of 1¾ per cent and a stock dividend of 1¾ per cent on the common stock, and the regular quarterly cash dividend of 1½ per cent on the preferred stock, all payable Aug. 2 to holders of record July 15. The company has been paying 2½ per cent in cash and 2½ per cent in common stock on the common stock each quarter for some time.

Successor Interurban Operating.—The Kansas City, Leavenworth & Western Railway has been authorized to do business in Kansas as the successor to the Kansas City-Western Railway, popularly known as the Kansas-Leavenworth interurban line. The company operates between Kansas City, Mo., and Leavenworth, Kan. The new company is the successor to the old under the terms of reorganization outlined in the ELECTRIC RAILWAY JOURNAL for March 13, 1920.

Dissolution Planned.—The Trenton (N. J.) Traction Company, organized as a holding concern in connection with the railway system of Trenton many years ago and inactive for approximately twenty years, is to be dissolved. A resolution to this effect has been passed by the board of directors, and a stockholders' meeting has been called for Aug. 13 for the purpose of completing the dissolution. John A. Rigg, Philadelphia, is the president of the company. Walter A. Rigg is vice-president, while T. W. Grookett, Jr., Philadelphia, is secretary-treasurer. These officials, together with F. W. Roebling, Jr., Dr. E. H. Ginnelly, Trenton, and R. L. Jones, Philadelphia, are the directors.

Amarillo System Resumes Under Municipal Ownership.—On July 1 the city of Amarillo, Tex., started the operation of the electric railway system of the Amarillo Street Railway under a lease from the owner of the system to the city of Amarillo, the lease running for three years with the option of extending under the same terms for a period of five years. The city of Amarillo assumes the responsibility of operating and the owner receives a rental for the use of the property. The system has been rehabilitated and the tracks and overhead rearranged so as to provide a more desirable system for the needs of the community. This system has not been in operation since October, 1917.

$4,200,000 Issue of Certificates Authorized.—Federal Judge Farris has authorized Rolla Wells, receiver for United Railways, St. Louis, Mo , to issue certificates of indebtedness amounting to $4,200,000 to provide for payment on bonds of the St. Louis Railroad which came due on May 1 last, and to take up receiver's certificates, due on Sept. 2, 1920. The issue may be dated and of such denomination to be decided upon by receiver and will bear interest at 7 per cent. The certificates will be a first lien on lines of railway properties and franchises of Union Depot Railroad, the St. Louis Railroad, mill tax judgment to city of St. Louis and liens of United Railways except liens executed by several companies whose lines were acquired by the receiver. The order also provides that the receiver shall make up the difference if discount and costs of selling certificates are not sufficient for this purpose. The War Finance Corporation went to the aid of the company with a loan during the war-time emergency.

Traffic and Transportation

Rhode Island Body Upheld

State Supreme Court Sustains Utilities Commission in Allowing Fare Increase

An opinion handed down by the Supreme Court of Rhode Island sustains the orders of the Public Utilities Commission allowing the Rhode Island Company, Providence, to increase its fares and to change the fare zones. Appeals were taken by the cities of Cranston and Pawtucket, and the towns of Warwick, Johnston, North Providence, Burrillville, West Warwick, Cumberland and East Greenwich at the time that the permission was granted the Rhode Island Company.

The appeals were taken from the order of the Public Utilities Commission entered Sept. 23, 1919. Arguments were made and briefs submitted by the City Solicitor of Cranston and the Town Solicitor of Warwick in behalf of those municipalities, and the cases of the other appellants were submitted without arguments or briefs.

COURT REVIEWS CASE

Judge Stearns, in his opinion, described the troubles of the Rhode Island Company leading up to the report of a special legislative committee presented April 2, 1918, together with an act authorizing the Public Utilities Commission to approve an increase of fares charged by the company from 5 cents to 6 cents.

On Sept. 23, 1919, the Public Utilities Commission entered an order whereby the Rhode Island Company was directed to file tariffs in modification of existing tariffs in accordance with "Plan B," so called. The effect of the order was to maintain zone limits existing at the time, to increase the fare from 5 cents to 6 cents in each zone and the charge for transfers from 1 cent to 2 cents. These tariffs were to remain effective during the receivership of the company and until otherwise ordered by the commission.

MANY TOWNS APPEAL

Various appeals were taken from the different orders entered prior to Sept. 23, 1919, and in each case the Supreme Court, on motion made, held that the appeal should not operate as a stay of the order. At the present time the receivers are operating the railway and are collecting the passenger revenue under the terms of the order of the Public Utilities Commission entered Sept. 23, 1919. The appeals from this order were the ones passed before the court. The court said:

> No question is raised in regard to the power of the Legislature to give authority to the commission to regulate the public utility in question, but the argument is made that it has not done so. We think there is no merit in this contention, and without detailed discussion of the matter we think the authority of the commission is clear and ample in regard to the subject matters under discussion.
>
> The general result of the order was to cut down the radius of the central zone about the traffic center of Providence to a radius of 2 miles, to make the fares in all zones, suburban as well as central zones, 5 cents, to fix a charge of 1 cent for each transfer issued. In its order the commission directed that the tariffs and supplements made effective on Oct. 23 should remain effective until March 1, 1919.
>
> That the State did not surrender unrestrictedly to the municipalities its governmental power of regulating rates is evidenced by the enactment in 1902 of the "Free Transfer Act." The paramount authority of the State to regulate rates of public utilities through the agency of a commission is well established.
>
> The orders of the Public Utilities Commission appealed from are sustained and affirmed. The appeals therefrom are denied and dismissed.

Ten Cents in Waterloo

Three cities do not make a State any more than a single swallow makes a summer. Dubuque, Des Moines and Davenport may not at the outset have extended the olive branch of peace to the utilities operating within their confines, but not all Iowa is to be blamed on their account. Recent comment in these pages was intended as a warning. Facts were stated merely as facts concerning these three cities. The city of Waterloo proves this to be so. There the board of arbitration appointed to settle the matter of fares has just announced an award of a 10-cent fare to the Waterloo, Cedar Falls & Northern Railway, with 8-cent tickets for working people, good between 6 a.m. and 8 a.m. and 5 p.m. and 7 p.m. Tickets for school children are to be sold at 5 cents each, good going to and coming from school. Waterloo proves that the spirit of live and let live is abroad in Iowa just as it has always been. That city, however, was quicker to sense a real public need than some of its sister cities.

Fare Increase Allowed

On June 25 the North Dakota Railroad Commission granted to the Fargo & Moorhead Street Railway, a subsidiary of the Northern States Power Company, increased fares effective in Fargo and the village of North Fargo, N. D. A similar schedule of fares had been granted by the voters of Moorhead, Minn., at an election held during the month of May by a vote of four to one. The new rates of fare effective in Fargo, village of North Fargo, N. D., and Moorhead, Minn., are as follows:

Cash fare	7 cents
Ticket fare	4 for 25 cents, 17 for $1
School tickets	20 for $1

This increased fare was put in effect temporarily for a period of one year by the North Dakota Board of Railroad Commissioners, pending their valuation of the property.

New Plan for Buses

Mayor Hylan Wants Privately Owned System with City Supervision—Railway Seeks Bus Grant

A city-wide system of privately owned, municipally supervised buses is now proposed by Mayor John F. Hylan of New York City as a solution of the transit problems of the metropolis. The Mayor's plan contemplates a bus service reaching all parts of the city. The fare would be 5 cents and universal free transfers would be given.

Mayor Hylan presented his new scheme to the Board of Estimate and Apportionment following the action of the State Court of Appeals in ruling that the city had no legal right to engage in bus operation. All the municipal bus lines paralleling the lines of the Brooklyn City Railroad are now out of business as a result of the court's decision. The new plan seeks to avoid legal difficulties by placing the operation of the buses in the hands of a private corporation under conditions of "the strictest municipal regulation and supervision."

FAIR RETURN PROPOSED

The Board of Estimate held a hearing on the matter on July 21, at which the Mayor explained his plan. Mayor Hylan would write the following conditions into the bus agreement:

1. An adequate and fair return to the security holders on an actual and honest investment for motor buses, garages and repair shops, but with a provision that there shall be no capitalization of franchise privileges granted.
2. A fair scale of wages for the employees.
3. An adequate, comfortable, sanitary, modern, safe and efficient service to the public for a 5-cent fare or less.

The Mayor said recently:

> Such an agreement should provide for a proper system of audit, control and supervision over the transactions and operations of any operator entering therein. Securities should be issued only for value received, excessive salaries and exorbitant overhead charges eliminated, and the property be economically and efficiently administered in the public interest. There is little doubt that such a system would be successful and would aid immeasurably in building up and adding to the prosperity of this city.

The Third Avenue Railway has applied to the New York City authorities for permission to establish a number of bus routes in connection with its electric lines. The buses would serve outlying sections of the city which now lack transportation facilities. A 5-cent fare would be charged, with a 3-cent charge for transfers to the company's railway lines.

Seven Cents in Dayton Soon

Car riders of Dayton, Ohio, will begin paying 7-cent fares on Aug. 7. The City Commission has formally approved an ordinance allowing the Dayton Street Railway, the City Railway and the other roads operating the local lines to raise their rates on that date. Four adults' tickets and eight half-fare tickets are to be sold for 25 cents. The companies are directed to file monthly reports of income and expenditures. The city is given the right to exact better service.

Jitneys Still Operating

Bridgeport Auto Men Secure Injunction Against New Ordinance—Trolleys Ready to Quit

Jitney operators of Bridgeport, Conn., have obtained a respite from the enforcement of the ordinance recently passed by the Common Council which would keep them off many of the city streets. Judge John W. Banks on July 22 refused to dissolve a temporary injunction, which he had granted on July 15, restraining the city from enforcing the terms of the jitney measure. Judge Banks held that while the Common Council had the right to fix bus routes, the clause delegating this power to the police commissioners was inoperative.

Judge Banks ruled as follows:

> In my opinion, the Common Council may fix the routes to be traversed by public service vehicles in the city of Bridgeport and exclude them from all streets not included in said routes. This, however, is not what the Council has done in the ordinance under consideration.
>
> The delegation to the police commissioners of the power to pick routes being inoperative, there is nothing left to the ordinance but a proviso that the commissioners shall not give their consent (which they would have no power to give anyway) to the operation of public service motor vehicles upon certain city streets.
>
> I do not see how the City Council can make this part of the ordinance effective as an exercise of the power to fix traffic routes. For these reasons I feel compelled to hold that the ordinance in its present form exceeds the power conferred on the city by Chapter 233 of the public acts of 1919, and is, therefore, void.
>
> The motion to dissolve is denied.

City's Petition Denied

Previous to the issuance of the injunction, City Attorney William H. Comley, Jr., had applied to the court for an injunction to stop jitneys from operating on the streets named in the ordinace. The petition was denied after Mr. Klein had pointed out that the city had a remedy at law because it could make arrests for violation of the ordinance.

The court action was the outcome of a futile attempt to reach a compromise. There were at the conference Mayor C. B. Wilson, Mr. Klein, Mr. Comley and Lucius B. Storrs, president of the Connecticut Company.

Counsel for the jitney men said that section 30 of the public acts of 1919 regulating motor vehicles provides that a municipality may by ordinance fix traffic routes for public vehicles. The ordinance just passed, it is contended, is based upon an amendment of the ordinance passed in December of last year, which gives to the police commissioners the power to issue permits for certain routes. If too many jitneys run on certain streets the commissioners have the power to prohibit any more using these same streets.

The defense of the representatives of the jitney men was that the police commissioners of the city were delegated power which does not belong to them.

Mr Storrs Insistent

Mr. Storrs insists that the jitneys shall be suppressed. In a letter to Mayor Wilson on July 19 he said:

> The trustees of the Connecticut Company are advised that a suit has been brought to test the validity of the ordinance recently adopted by the Common Council of the city of Bridgeport for the regulation of jitney transportation, and that the Superior Court has reserved its decision upon an application for a preliminary injunction in such suit.
>
> As you have been advised, the company is operating in the city of Bridgeport at an actual heavy loss and cannot continue for any extended period under existing circumstances.
>
> By such action of the Superior Court the ordinace has, for a time at least, been rendered ineffective, and as our agreement to postpone discontinuance of service was conditional upon the ordinance being made immediately effective, the Connecticut Company is free to discontinue its service, but is unwilling to do so without notice.
>
> As we are informed, however, that a decision upon the application for an injunction is expected within a very short time, we will continue operation, notwithstanding our losses, until July 26, but cannot undertake further operation if conditions remain unchanged.

The trolley-jitney situation in New Haven was brought before the Board of Aldermen of that city on July 21, when a message from Mayor Fitzgerald was read. The Mayor submitted a letter received from Mr. Storrs and a petition received from a committee of conductors and motormen of the company. At the suggestion of the Mayor, the entire subject was referred to a special committee.

Seven-Cent Fare Approved for Rochester

A 7-cent car fare will become effective on Aug. 1 on the Rochester lines of the New York State Railways. The Common Council of Rochester, at a special meeting on July 14, adopted the report of its law committee on the service-at-cost contract and this contract has been signed by both Mayor Edgerton and James F. Hamilton, president of the New York State Railways. Under the contract, the return to the company is determined, in a measure, by the rate of fare. The lower the fare the higher will be the rate of return.

The suggestion of James W. Routh, director of the Bureau of Municipal Research, that the contract be amended to include a provision for the easier discharge of the railway commissioner should he prove incompetent and the suggestion that some penalty be provided for raising the fare above the tentative figure of 7 cents were disregarded. In its report the committee says that there is adequate protection in the contract against unreasonable increases in fare, and that the committee believes the commissioner's service to the city would be impaired if provision was made for his arbitrary dismissal.

The contract was amended by the law committee by the addition of a provision for the appointment of a third arbitrator and appraiser should those appointed by the company and the city's representatives fail to agree on the third man. Provision is also made to prevent the renewal and depreciation fund from exceeding 2 per cent of the base value of the company's property at the termination of the agreement.

Zone System Rejected

Connecticut Company Operating 700 Miles of Line Wants Seven-Cent Fare—Hearing on July 29

The Connecticut Company on July 22 petitioned the Public Utility Commission to revoke the zone system imposed upon the company by that commission on March 30, asking as a substitute substantially the same distances as were used in determining rides under the 6-cent fare system, but with 7 cents as the base fare.

The Utilities Commission, whose zone plan for collecting fares superseded the company's own distance tariff plan which went into effect on Nov. 2, 1919, will grant a hearing to the company on July 29 at 10 a.m. daylight saving time.

The tariff proposed by President Lucius S. Storrs of the company is as follows:

> Flat rate of fare 7 cents.
>
> On rural lines fare limits to be 2.8 miles apart.
>
> On short city lines flat rate to appiy to entire line.
>
> On all long city lines first fare limit to be approximately 3 miles from traffic center.
>
> Free transfers to be given to all passengers from and to points not more than 2½ miles from tne traffic center.

All Costs Advance

Unusual increases in operating costs, which include a payroll whose total is $1,000,000 larger than that of last year, are given as the reasons for asking that the rate be increased. After stating that the requests of the cities of Manchester and New Haven caused the commission to insist on the company's issuing commutation tickets, the petition says:

> Though your petitioner has made every possible endeavor to make such system a success and the same has had a fair trial, said system has not produced a revenue sufficient to cover the cost of service with any return whatever upon a fair valuation of the property, and does not now produce the actual cost of operation. Wherefore your petitioner prays leave to install forthwith a flat fare system of rates upon lines, with a base or initial fare of 7 cents in accordance with the tariff hereto annexed.

The petition of the company for an increase in fare allowance is a departure from precedent, as was the action last March of the Public Utilities Commission in imposing on the railway a fare system of its own. Heretofore the company has initiated fare systems, which were defended before the Public Utilities Commission when petitioners from towns protested. The company has at the present time an appeal before the Superior Court in the matter of commutation tickets, the company's attorneys taking the stand that the imposition of fares for ordinary riders by the Public Utilities Commission shows that these rates are reasonable, and therfore any rate below those is confiscatory and unconstitutional.

A statement issued to the press by the company, on the afternoon of July 22, read:

> In order to meet increases in cost of operating the railway service the Connecticut Company must obtain a greater revenue. The payrolls for 1920 will be $1,000,000 greater than last year, due to recent advances in rates of pay. Coal, which cost $4 per ton a few years ago, is now selling for $13 per ton and at times even more.

The authorities in the various cities where efforts are being made to restrict ruinous jitney bus competition have asked us to return to a flat rate of fare collection and we are, therefore, proposing a 7-cent flat rate of fare covering the largest portion of each city area, but not including the entire areas falling within the old 5-cent fare limits.

As we are now obtaining fares of 8, 10 and 12 cents from a large number of passengers whose payments will be reduced to 7 cents, it is clear that no lower rate will produce sufficient revenue. We have no means of determining whether the 7-cent rate will be high enough, although it is possible that with a restriction of ruinous jitney bus competition and a large use of the cars we may be able to establish a lower rate.

Every effort will be made to retain service upon all the lines now operated, including all those in the country areas, but of course sufficient revenue must be obtained to meet the cost of operating the cars.

The company has been in the hands of receivers since 1916. In 1917 it instituted a 6-cent fare system, which was changed on Nov. 2, 1919, to a distance tariff system. On complaint of several of the towns and cities of the state, the utilities commission discarded this system and put in a distance tariff of its own, allowing a cut rate for purchasers of fifty-zone tickets and granting commutation rates to daily suburban riders.

Fare Increase Contemplated

The Milwaukee (Wis.) Northern Railway has petitioned the Wisconsin Railroad Commission for permission to discontinue the sale of six tickets for 25 cents good on the company's line within the city of Milwaukee. The cash fare will remain at 5 cents, as at present.

The company operates an interurban service connecting Milwaukee, Cedarburg, Port Washington and Sheboygan, all points in Wisconsin. It also operates a city service over its line within the city of Milwaukee. The rate of fare for this service is fixed in its franchise at 5 cents cash or eight tickets for 25 cents. In July, 1918, the company was authorized by the Wisconsin Railroad Commission to increase the rate of fare by reducing the number of tickets sold for 25 cents from eight to six. A flat 5-cent fare is now sought because of increased labor and maintenance costs.

Wants Ten Cents in Scranton

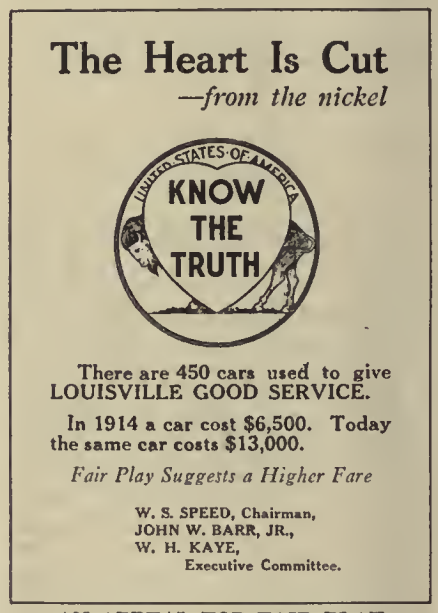
Stating that the company can no longer continue to operate on a 7-cent rate, the Scranton (Pa.) Railway has filed with the State Public Service Commission notice of its intention to raise its fare to 10 cents. The company's action follows the recent award of a substantial wage increase to its employees by a board of arbitration. The Pennsylvania Supreme Court recently ruled that the commission has full power to fix rates for electric railway service.

Jilson J. Coleman, general manager of the company, gave out a statement supplementing that of the petition and laid particular stress on the fact that the company cannot continue to operate on a 7-cent fare and could not expect to get along with an 8-cent fare, hence the request that a 10-cent rate be permitted. Mr. Coleman said the increases in wages since 1914 have totaled 124 per cent for the motormen and conductors; 135 per cent for the barnmen, and 189 per cent for the trackmen. In addition he pointed out that the cost of material has advanced more than 100 per cent on a general average during this period.

The company has lost more than $58,000 since Jan. 1, and is continuing to earn less than the operating costs. Since 1917 the only increases have been from natural growth and increases in fare rates. Wages for this year will be increased more than $150,000, the wages covered in the recent award amounting to $148,000.

May Amend Louisville Plan

Passage in its present form of the ordinance recently submitted to the City Council of Louisville, Ky., providing for a cost-of-service franchise for the Louisville Railway, now seems improbable. Opposition to the measure as presented by the executive committee of the railway has developed in the Council. Public sentiment is also unfavorable to the granting of the franchise without a number of changes.



AN APPEAL FOR FAIR PLAY

Hopes for a compromise are held out as the result of a statement by W. S. Speed, chairman of the directors' executive committee, that the company would not object to changes in the ordinance as drawn as long as efficient transportation is given to Louisville and the lines are saved from bankruptcy. It has become known that if the company's present effort to obtain higher fares fails, a receivership is contemplated. Under the terms of the cost-of-service agreement the initial fare would be 7 cents.

The objections to the ordinance cited by civic organizations and members of the Council are: Compensation for members of the Board of Public Works to be paid out by the railway; the turning of extra earnings into the city treasury; opportunity for the company to revise upward but none for the city to revise downward; failure to limit the period during which increased fares will be charged; the request for the city to guarantee dividends of 6 per cent on $24,500,000 physical valuation shown by the company's books while the company's sworn statement in the City Assessor's office shows an actual physical valuation of $4,700,000.

The company has been conducting an active campaign of education through advertisements in the Louisville newspapers. It calls attention to increases in the prices of commodities generally and asks the public to "know the truth" about electric railway service. One of these advertisements is reproduced in the adjoining column.

Seek Compromise in Tacoma

Company Wants Four to Eight per Cent Return on $6,000,000 Valuation— Mayor Opposes Fare Rise

The Public Service Commission of the State of Washington, which recently completed its hearing in the matter of an increase from a 7 to a 10-cent fare on the lines of the Tacoma Railway & Power Company has deferred the announcement of its decision. In the meantime, a compromise will be attempted on the following basis: Commutation tickets to be sold 15 for $1; 10-cent fare for casuals; the company to be granted some relief from gross earnings tax, street paving and free passes for city employees.

Mayor C. M. Riddell and Commissioner Fred Shoemaker, on the witness stand before the commission, declared that a straight 10-cent fare would mean granting franchises to jitney buses. It is stated that a local association in Tacoma has offered to put fifteen large jitneys in operation if the 10-cent fare is granted. City Councilmen have stated that, if necessary, they will grant franchises to the jitney men.

SEEKS ADEQUATE SERVICE

The railway, in its brief, demands a fare that will provide for cost of operation, depreciation, and from 4 to 8 per cent profit on a $6,000,000 valuation.

City Attorney U. E. Harmon has suggested that a compromise be offered the company. The new proposition would provide for the city to have joint supervision of the operation of the lines for a period of one year, the fare to remain 7 cents; the city to appoint three supervisors to waive for the period of one year the payment of gross earnings, taxes and free transportation of city employees, provided the amount thus waived, plus the addition of sums necessary to put the streets in proper condition, be expended in such street improvement.

Commissioner of Finance Silver has gone on record as opposing such a plan. He has stated that he will make an effort to put the railway out of business on several of its best-paying lines, where franchises have expired.

Injunction Against Jitney Repeal Measure

A restraining order has been issued by Presiding Judge Mitchell Gilliam, at the request of counsel for the Seattle (Wash.) Jitney Drivers' Association, to prevent the city from suspending operation of jitney buses on city streets. The order was issued just in time to prevent the cessation of jitney activities, as Superintendent of Utilities Carl H. Reeves had served notice that no jitneys would be permitted to operate after midnight on July 6, except those to which permits had been granted, and the Council has granted no permit to drivers. Before the order had been issued, ten drivers who undertook to operate without permits were arrested. They were released when the restraining order became effective.

Major Reeves' order was issued, after the City Council had finally rejected the applications of all drivers for permits, on the recommendation of the public utilities committee, leaving a loophole which would allow the issuance of permits to short lines operating as feeders to the municipal railway.

The petition filed by the jitney drivers, calling upon the City Council to present to the qualified electors of the city an ordinance permitting jitney drivers to operate along routes of their own choice, in repeal of the existing city ordinance providing for strict regulation of jitneys, is being checked by City Comptroller Harry W. Carroll, to determine if the signatures of the petition are qualified as on the registration books of the city.

If it is found that the petition bears sufficient signatures of qualified citizens, the Council will be required to submit the initiative measure to the people. Adoption of the initiative ordinance by the voters at a special election would repeal existing jitney regulations, and require drivers to go through only the formality of applying for permits to operate on routes of their own choice. The city would have no power to refuse such applications or to specify routes and schedules for the jitney lines.

Bus Company Suspends

H. S. Albrecht, receiver for the Missouri Motorbus Company, operating in St. Louis, obtained a court order on July 1 authorizing the suspension of operation of the buses. He stated that the company did not have sufficient funds to meet its payroll or purchase gasoline and that he had been unable to borrow money necessary to continue operation.

The bus company was organized late in 1919 with a capital stock of $300,000. It began operations on Feb. 9 with eleven double-deck buses having a seating capacity of sixty persons each. A regular schedule was maintained between Delmar and Hamilton Avenues and Sixth and Locust Streets. The fare was 10 cents. Contracts were let for about forty additional buses, but deliveries were held up on account of lack of funds.

Wheeling Wants Zone Fares

The Wheeling (W. Va.) Traction Company is filing new passenger fare tariffs with the Interstate Commerce Commission, the Public Utilities Commission of Ohio and the Public Service Commission of West Virginia, asking for authority to establish a zone system beginning Sept. 1. It is proposed to make up the entire system with a series of so-called major and minor zones, the major zones being approximately the same as those now in effect and the minor zones dividing these major zones in half as nearly equal as natural loading and unloading conditions will permit.

The initial fare will be 8 cents cash or 6⅔ cents on the basis of the universal ticket to be good on any division of the property and to be sold by the conductors on the cars or at any regular ticket office of the company. These universal tickets will be sold on the basis of nine minor zone tickets for 30 cents, six two-minor zone tickets for 40 cents and three four-minor zone tickets for 40 cents. Each minor zone ticket would have a value of 3⅓ cents and two-minor zone tickets will be required for the initial ride in any zone.

The cash fare for any minor zone after the initial ride will be 4 cents. The ticket charge for a minor zone after any initial charge will be 3⅓ cents.

B. R. T. Will Seek Increases Under Recent Court Ruling

Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, has announced that he will apply for fare increases for those companies of the system which the Court of Appeals in its decision held were under the jurisdiction of the Public Service Commission. These were the lines the franchises of which were granted prior to Jan. 1, 1875, and subsequent to the passage of the Public Service Commission law on July 1, 1907. Mr. Garrison's statement said in part:

> It is impossible in the short time now at my disposal to apply the decision of the court to each of the lines and separate the different franchises so that the one class that the court says is not within the jurisdiction of the Public Service Commission is picked out and put by itself. All but a very few of the franchises of these three companies are held to be within the jurisdiction of the Public Service Commission.
>
> I shall immediately comply with the privilege extended to me by the court and present to the Public Service Commission proper applications for action in respect of the franchises that the court holds the Public Service Commission has jurisdiction over.

Dallas Increase Favorably Received

The very thorough publicity methods of the Dallas (Tex.) Railway in placing the case of the company before the public are believed to have been very largely responsible for the people of that city accepting so gracefully the recent increase in fares to 6 cents. The Dallas *News*, voicing public sentiment on the fare question in a recent editorial, said in part:

> All who were opposed to having the fare increased were given an opportunity to express their opposition, and not enough have done so even to bring about a referendum.
>
> Six cents has become rather less than the average electric railway fare, so that, instead of having reason to complain, we have reason to congratulate ourselves on getting our transportation at the least cost made possible by the economic and financial conditions. But there ought to be a better satisfaction than this in the reflection that in increasing the fare to 6 cents we are doing justice to the railway and at the same time serving the best interests of Dallas. Already insufficient, our transportation facilities must have become increasingly inadequate under a continuance of the 5-cent fare.
>
> The people of Dallas are to be congratulated on the disposition made of this matter, which is equivalent to saying that the Mayor and Commissioners are to be commended for the courageous and enlightened way in which they have solved this problem.

Seven-Cent Fare in Salt Lake

Under authority of an order issued by the State Public Utilities Commission, the Utah Light & Traction Company, Salt Lake City, Utah, on July 3 raised its cash fare from 6 cents to 7 cents. The commission ordered the company to sell four commutation tickets for 25 cents, and to raise the price of school tickets from 3 cents to 4 cents. The company's request for a 1-cent transfer charge was denied. The commission recommended the adoption of the one-man safety car by the company, and also called attention to the fact that the State law with regard to street paving was unduly increasing the cost of transportation to the car-riding public.

The cost of paving, it was pointed out, amounts to ½-cent a ride. The commission contended that by the adoption of safety cars the service would be bettered and that at the same time costs would be reduced. The commission urged that every possible method be made to reduce operating cost. During the first five months of 1920 there was an increase of 1,601,781 in the number of passengers carried as compared with the same months of 1919, while the financial returns for the first quarter of 1920 show an increase in the net operating income of $17,033.

The company petitioned for a 7-cent fare early this year. It later applied for an 8-cent fare.

"Memphis Trolley Items"

The Memphis (Tenn.) Street Railway is putting out a little publication for its patrons which is distributed through pockets in each car. It is called *Memphis Trolley Items* and is for the information and entertainment of the patrons. "Avoid Accidents," "The 6-Cent Fare and Today's Prices," "Service Interruptions," "Executing a Public Trust," "The Women of History," "Week's Amusement," "Safety First Alphabet," "Transportation Necessary to City's Growth," "Help Keep Down Unnecessary Expenses" are parts of the *multum in parvo* in a recent issue. They are always bright and snappy.

Transportation News Notes

Fares Raised on Iowa Line.—The Clinton, Davenport & Muscatine Railway placed in effect on July 15 an increase in passenger rates of 6 per cent. The fare from Davenport to Clinton is now $1.25 as compared with $1.20 under the old tariff.

Eight Cents in Hornell.—An 8-cent cash fare took effect on the lines of the Hornell (N. Y.) Traction Company on July 9. The new rate was authorized by the Public Service Commission for the Second District. The fare was formerly 6 cents. The company has not met bond interest payments for the past five years.

Eight Cents in Hammond.—Fares on the lines of the Hammond, Whiting & East Chicago Railway, Chicago, Ill., in Hammond, Whiting and East Chicago, Ind., became 8 cents on July 1. The Indiana Public Service Commission, in authorizing the new rate, ordered the company to sell tickets at the rate of fourteen for $1.

Three-Cent Line Denied Rise.—The Public Service Commission for the First District has denied the application of the Van Brunt Street & Erie Basin Railroad, Brooklyn, N. Y., for an increase in fare from 3 to 4 cents. The company has increased its earnings during the past year. The net corporate income for the nine months ending March 31, 1920, amounted to $8,375. The line is three miles long.

Seeks Rise in St. Joseph.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has applied to the Missouri Public Service Commission for permission to increase its fare to 9 cents. Six months ago the commission allowed the company an increase from 5 to 7 cents. The company claims that during this period it has lost $9,174.

Approves Bay State Rise.—A tariff schedule providing for an increase in fare from 6 cents to 10 cents on the lines of the Connecticut Valley Street Railway, Greenfield, Mass., has been approved by the State Department of Public Utilities. The new rate went into effect on July 13. The company is selling tickets at the rate of 7½ cents each.

Prefers Higher Rate to Shutdown.—The City Council of Findlay, Ohio, has notified the Toledo, Bowling Green & Southern Traction Company, Findlay, that it is willing to grant an increase in fare on the city line, if the company will withdraw its application for abandonment of the tracks, recently filed with the Council. Street assessments, it was stated, would be kept to a minimum.

Ten-Cent Fare in Portsmouth.—The New Hampshire Public Service Commission has authorized the Portsmouth Electric Railway, Portsmouth, to charge 10-cent fares on its lines. The company has also received permission to raise the price of transfers from 2 cents to 5 cents. The fare was formerly 7 cents. The company is a subsidiary of the Boston & Maine Railroad.

Will Extend Freight Service.—The Boston & Worcester Street Railway, Boston, Mass., will shortly put in operation through freight service in conjunction with the Worcester Consolidated Street Railway and the Springfield Street Railway to points west of Worcester. The new service will give early morning delivery at destination of all goods shipped the day before.

Ten-Cent Joint Rate Allowed.—The Public Service Commission for the Second District has authorized the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to charge a 10-cent fare between Seneca Street, Buffalo, and the plant of the Lackawanna Steel Company, Lackawanna. The company uses the tracks of the International Railway within the Buffalo city limits. It had sought to abandon this service.

Higher Fare in Savannah.—A 7-cent cash fare became effective on the lines of the Savannah (Ga.) Electric Company on July 16. The increase from the former 5-cent rate was authorized by the State Railroad Commission, which had had the company's petition under consideration for some time. The company was ordered to sell ticket books containing fifteen tickets for $1. An increase in lighting and power rates was also authorized.

Three Cents a Mile in Maryland.—Fares on the line of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., were placed on a basis of 3 cents a mile on July 11, under authority of an order of the Interstate Commerce Commission. The new fare between Baltimore and Washington is $1.05, and the round-trip rate is $2.03. The old rate was 92 cents, round trip $1.50. The single fare in the District of Columbia to the District line is 8 cents.

Higher Rates on Penn Lines.—The Chambersburg & Shippensburg Railway, Chambersburg, Pa., has filed with the State Public Service Commission notice of increase of fares in Franklin and Cumberland Counties from 7 to 8 cents. The Altoona & Logan Valley Electric Railway, Altoona, has given notice of 7-cent fares, with advances in charges for funeral cars. The Irwin-Herminie Traction Company, Irwin, has advanced its zone fares, school rates, express and freight rates.

Plans Referendum on Fare Rise.—An ordinance authorizing the Sioux City Service Company, Sioux City, Iowa, to charge a 6-cent fare for a three-year period will be submitted to the voters of Sioux City for their approval at a special election on Aug. 17. The measure provides that at the end of three years the company shall return to the present 5-cent fare. If the fare increase is authorized the company will pay its platform men a wage scale of 50 to 60 cents an hour. The present scale is 38 to 43 cents.

Operating Ratio Now 100 per Cent.—Mayor Walton of Oklahoma City, Okla., is to appoint a committee of five men to inquire into the affairs of the Oklahoma Railway. This company has operated thus far under a 5-cent fare. It is now hauling almost 80 per cent more passengers than four years ago with the same number of cars. In 1916 the revenue was 25 cents for each mile while the expenses were 16 cents a mile. At present the revenues and expenses are equal at 40 cents for each car-mile. The company has requested that the fare be increased to 7 cents on a cash basis, or 6¼ cents for tickets.

Eight-Cent Fare Not Yet Granted.—The need for immediate action authorizing an 8-cent fare was urged on July 9 by Andrew C. Gray, counsel for the Wilmington & Philadelphia Traction Company, Wilmington, Del. This company filed its petition early in June. All the requirements of the utility board had been complied with. The property had been looked over and from the appraiser's point of view a 9-cent fare would be required to net the company an adequate return. However, the company was willing to try operation on an 8-cent fare. What the company wants is action on the part of the Public Utility Commissioner, for the need now is very urgent. The company put the 7-cent fare in effect last fall under authority granted by the city utility board.

Eight Cents in Jamestown.—Authority has been granted by the Public Service Commission for the Second District of New York to the Jamestown Street Railway to charge a cash fare of 8 cents in place of the present 7-cent cash and 5-cent ticket fare, the order to remain in effect until changed by the commission, either on its determination or under a complaint. The order provides that under the 8-cent fare the company shall place strips of five tickets on sale at 35 cents, purchasers to be limited to two strips at a time. Transfers are to be given on a cash or ticket fare to points within Jamestown on the Jamestown & Warren Railway line, and the Jamestown Street Railway is to accept transfers issued by the other local line. All Jamestown Street Railway tickets outstanding are to be redeemed by the company. Present regulations of the company including those relating to the transportation of children in Jamestown are not affected by the order, which is to become effective on one day's notice. No change is authorized in the order in the 5-cent cash fare applicable to passenger transportation between points within the town of Ellicott or the villages of Celeren, Lakewood or Falconer.

Personal Mention

Commission Named to Inquire Into Ontario Hydro-Radials

The Ontario Government has announced the appointment of the special commission to investigate and report on hydro-radials. The members are as follows: Justice Sutherland, chairman; T. A. Russell of the Russell Motor Car Company, Toronto; Fred Bancroft, labor leader, Toronto; W. A. Amos, vice-president of the United Farmers of Ontario, Palmerston; A. F. MacCallum, city engineer and commissioner of works, Ottawa.

Justice Sutherland, chairman of the commission, was speaker of the House of Commons from 1905 to 1909 and was Liberal member for North Essex in the House of Commons. He practiced law in Windsor until his elevation to the bench.

Mr. Bancroft is a well-known labor man, having been vice-president of the Canadian Trades Congress. He has been on several arbitration and conciliation boards representing the men. He is a member of the Patternmakers' Union, but is at present in newspaper work. He is said to be a strong supporter of public ownership.

Mr. Amos, the vice-president of the United Farmers of Ontario, was formerly a Presbyterian minister. Illness caused him to retire from the pulpit, and he is now a farmer in Perth County. At the last provincial election he was the United Farmers of Ontario candidate in North Perth, but was defeated. He is one of the big men of the U. F. O. organization.

Mr. Russell is president of the Russell Motor Car Company and a prominent manufacturer. He served as a delegate from the manufacturers of Canada at the Imperial Commercial Conference in 1906. He has been secretary of the Toronto Manufacturers' Association.

Mr. MacCallum, at present commissioner of works in Ottawa, was formerly assistant engineer for York County, and later city engineer in the city of Hamilton. He has been on several arbitration boards.

The commission will start work immediately. All sittings will be public.

C. R. Barnes to Be Rochester Commissioner

Charles R. Barnes, electric railway adviser to the Public Service Commission for the Second District, has been appointed Street Railway Commissioner of Rochester, N. Y. In his new capacity Mr. Barnes will have supervision for the city of the local lines of the New York State Railways. The position which he will occupy is created under the terms of the cost-of-service agreement which will go into effect on Aug. 1. Mr. Barnes will have control of schedules and will generally direct the operation of the Rochester lines.

Edwin Gruhl, Vice-President

Assistant to President Advanced by Board of North American Company

Edwin Gruhl has been elected a vice-president of the North American Company. He has been assistant to the president since November, 1912.

Mr. Gruhl was graduated from the



EDWIN GRUHL

University of Wisconsin, Department of Economics, class of 1908. While attending the university he delayed his course one year, during which time he was engaged in valuation work with the enginering staff of the Wisconsin Railroad and Tax Commissions. Following the resignation of W. J. Hagenah, Mr. Gruhl succeeded him as statistician of the Railroad Commission of Wisconsin. This position he occupied up to the time he joined the North American Company. He taught in his alma mater, lecturing to a class on public utility economics during the time he occupied the position of statistician of the commission.

Mr. Gruhl has been a frequent contributor to the technical magazines and the proceedings of the American Electric Railway Association. He represented the committee on cost of passenger transportation service, of which J. D. Mortimer was chairman, in the deliberations that led to the preparation of F. W. Doolittle's book "Cost of Urban Transportation Service."

Mr. Gruhl has for some years been vice-president of the Wisconsin Edison Company, Inc., and president of the Wells Power Company, a subsidiary of that company. He has also been assistant to the president of the Milwaukee Electric Railway & Light Company and the Union Electric Light & Power Company, St. Louis.

C. E. Atkinson, superintendent of equipment of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has resigned.

Michael J. Walsh, chief dispatcher at the Brooklyn Bridge station of the Brooklyn (N. Y.) Rapid Transit Company, has been made depot master at the Flatbush Avenue station.

Morton S. Cornell, division superintendent of the Flatbush Avenue lines of the Brooklyn (N. Y.) Rapid Transit Company for the past ten years, has been transferred to the Fifty-eighth Street division, where he succeeds Edwin Gilchrist. Mr. Cornell has been connected with the B. R. T. since 1895.

Edwin Gilchrist, division superintendent of the Fifty-eighth Street lines of the Brooklyn (N. Y.) Rapid Transit Company, has been granted a leave of absence. Mr. Gilchrist has been connected with the B. R. T. system for the past twenty-nine years. Early in 1900 he was appointed dispatcher and later in the same year he was made depot master. In 1906 he was made a division superintendent.

Major Gustave Storch, master mechanic of the Paulista Railway, Sao Paulo, Brazil, is spending a few weeks in this country, familiarizing himself with the details of construction of electric locomotives such as those in use on the Chicago, Milwaukee & St. Paul and Butte, Anaconda & Pacific lines. The Paulista Railway will shortly have in operation sixteen electric locomotives, twelve General Electric and four Westinghouse, which will be similar in many particulars to the machines which Major Storch is examining. He is making a special study of maintenance practice. Major Storch is accompanied by his general foreman of shops and others.

George R. Green has been appointed superintendent of equipment of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., to succeed C. E. Atkinson, resigned. Mr. Green was born in Butler, Ind., April 29, 1887. He began his work in the electric railway field when he was only fourteen years old. This was in 1901, when he went to work for the Detroit United Railway, where he continued for eighteen years, except for three years between 1909 and 1912, during which time he was master mechanic of the Saginaw & Flint Railway. During most of this period he was employed in the mechanical department, rising to the position of general foreman of interurban equipment, which position he recently resigned. During two years of his service with the Detroit United Railway he served as assistant division superintendent.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Deliveries of Rail Bonds in Good Shape

Traction Companies Ordering Only What Is Needed for Maintenance Work—Prices Appear Steady

Demand for rail bonds does not seem to be especially heavy just now as compared with past years, practically all of the ordering representing maintenance work, which is going forward at a normal pace, according to representative manufacturers of this material.

Delivery figures as quoted by several producers range from two to four weeks, although one company gave two months as its average, stating that deliveries, which they had been making in about a month, had now lengthened to twice that long as a result of slow shipments. Transportation troubles, as a matter of fact, seem to be the main factor in slowing up shipments, as there is no shortage of copper. One manufacturer, rather than depend upon the uncertainties of freight transportation, recently shipped a large order of rail bonds by express. Another big producer, however, believes the freight situation is beginning to ease up. Production for this latter company is well up to its usual standard.

If the term "stocks" can be applied to this particular item, they may be said to be in pretty good shape, inasmuch as most producers make rail bonds according to specification, but such small stocks of standard material as are usually carried are in about normal supply.

No price changes have been recorded since the downward fluctuation of about four months ago, and opinions agree that prices are likely to continue steady.

Reports on collections are about evenly divided, one view holding that they are fairly good and better than in the past, while other manufacturers say the utilities are slow in meeting their bills on account of financial difficulties, with probably half of them being classed as delinquent in payments. Money tightness, nevertheless, apparently has not caused electric railways to cancel or reduce orders, as no steps in that direction have been reported. Nevertheless, traction companies are ordering this equipment only as absolutely needed.

Priorities Help Electric Railways Get Coal for Current Use

Speculators and Market Manipulators, Through Abuse of Reconsignment Privilege, Aggravate Yard Congestion and Hold Up Car Movement

A coal shortage exists, due to inadequate transportation facilities, and there is a mad scramble for priority by coal users. Reports are prevalent on coal hoarding, overproduction, market manipulation, etc., but an analysis of the situation by the staff of *Coal Age* and the universal industrial demand for coal all tend to prove that an actual shortage exists, although aggravated by speculators.

The Interstate Commerce Commission has attacked the problem on a priority basis by fixing a "preference list" and a "geographic list" for coal distribution for sixty days from June 21 last by the method of assigned cars. The essential industries and utilities are given preference and also those districts which are so situated that they must obtain a coal supply at certain seasons or do without. In agreement with this plan the commission has assigned open cars to the coal mines, has permitted priority on coal car assignments to public utilities and has assigned geographical priority in coal distribution.

It is hoped relief will follow the remedies, but past experience with priority schemes indicates that they react to increase and not decrease transportation difficulties. When, therefore, inadequate transportation is the cause of the coal shortage prospects are not bright for immediate improvement in the general coal situation, even though the utilities themselves should more readily obtain coal by the aid of the priority order.

On July 8, 9 and 10, Division 5 of the Interstate Commerce Commission held a hearing in Washington on the coal situation. At this hearing the American Electric Railway Association was represented by Secretary E. B. Burritt for the committee on national relations, and as a result of the evidence presented the commission issued Order No. 9, which amends and suspends Order 7 and applies only to territory east of the Mississippi.

The part of the order relating to priority for utilities, including electric railways, reads as follows:

> It is further ordered that until and including Aug. 19, 1920, all common carriers by railroad within said teritory, to the extent that may be necessary in order that public utilities, including street and interurban railways, electric power and lighting plants, gas plants, ice plants, water and sewer works, also hospitals, schools and other public institutions, may be kept supplied with coal for current use but not for storage, be and they are hereby authorized to place, furnish and assign cars to coal mines for the transportation of such coal, in addition to and without regard to the existing ratings and distributive shares for mines upon said railroads; provided no cars shall be so placed, furnished or supplied by any such carrier without written application therefor from the public utility, concurred in by the delivering railroad, showing that such coal is needed for current use, and not for storage, in order that the applicant may continue in daily operation, and provided further, that such coal shall not be subject to reconsignment except to public utilities or public institutions, and that a written report of the cars placed hereunder shall be promptly made to the Interstate Commerce Commission by the railroad placing the cars.

Written Applications Necessary

This order indicates that a written application and evidence of coal shortage, together with concurrence by the delivering carrier, are required by an electric railway, for example, before coal can be delivered for current use. No consideration is given to coal for storage.

There is no question that speculators and market manipulators have reaped harvests through abuse of the reconsignment privilege. The ability to juggle cars from place to place is an incentive to speculators to manipulate the markets and not only aggravates the shortage but congests the yards in the large terminals and holds up coal car movement. An absolute prohibition of manipulative reconsignment and a heavy advance in demurrage rates would, if rigidly enforced, eliminate this element from the situation.

Experienced coal men offer no prediction as to the trend of the coal market, but, based on production and transportation conditions, they look for no break in coal prices in the near future, as lack of reserve stocks forces most industries to purchase coal at once on the best possible terms.

Spot prices show wide variation and as high as $23 a ton delivered has been reported paid by Eastern utilities within the past ten days.

The Public Service Corporation of New Jersey last week paid $14 for one lot and had more offered at $17.50 which it refused to buy on the basis that the cost was exorbitant. The Public Service Commission of the Second District of New York stated that New York utilities within the past few days had paid anywhere from $16.40 to $23.10 for coal. One shipment of 2,000 tons was bought f.o.b. Staten Island for $14.50. This coal, delivered at the boilers, will probably cost between $16 and $18 per ton.

It is interesting to note in this connection that tidewater coal for New York was quoted in 1914 from $2.82 to $3.25.

Coal Age reports the following prices this week for bituminous coal from the sections named: Boston, Cambrias and Somersets, f.o.b. mines, $11.50 to $13, net tons; f.o.b. Philadelphia, gross tons, $14.75 to $16.50; f.o.b. New York, gross tons, $15.10 to $16.85; New York, f.o.b. piers, from $16 to $16.25; alongside, from $17 to $17.25. Philadelphia, $12.50 to $14, f.o.b. Pennsylvania mines. Baltimore, $11 to $13 per net ton for f.o.b. mine. Buffalo, $10 to $10.50 f.o.b. mine. Union Town, Pa., $11.25 and $11.75 for classified coals. Columbus, Hocking screenings, $5 to $8 f.o.b. mine with 50 cents additional for mine-run. Chicago, mine-run, $5.50 to $6.50, f.o.b. mines. Birmingham, $6.50 to $8.50 for spot coal, f.o.b. mines. Louisville, western Kentucky mine-run, $5 to $5.25, f.o.b. mine.

The latest element in the situation is the hearing instituted by the Senate committee on reconstruction and production, of which Senator W. M. Calder of New York is chairman. This committee met in New York at the Engineering Societies Building early this week and intends to go into the situation thoroughly, particularly as regards transportation and the alleged profiteering.

Pole Line Hardware Stocks in Poor Condition

Heavy Demand Continues, but Much of It Seems to Be for Repair and Maintenance

Unusually strong demand for pole-line hardware seems to have virtually cleaned out manufacturers' stocks of finished goods. One large company states that its volume of business for June was the largest in its history, and the general situation seems to reveal more business on hand than can be taken care of.

Naturally, with transportation in its present state of chaos and steel mills accepting orders for material on condition of no promise being made as to date of shipment, deliveries are running rather long, and according to representative producers they range from three to five months. One important jobber however, states that he is able to obtain supplies in from six to eight weeks.

In spite of impatience at long unfilled orders, very few customers are availing themselves of the privilege of canceling their orders. This may be owing, as one of the manufacturers expressed it, to careful supervision of the new orders accepted, since producers can afford to use some discrimination in the matter.

Labor troubles in the past have been affecting this market, but at present little difficulty seems to be experienced in that respect, and though production probably is not yet up to normal capacity, it is said to be improving.

Back orders of long standing are generally the rule, thus effectually preventing the accumulation of any stocks worth mentioning, although a representative company in the field has very large supplies on the way, and with their expected arrival in about four weeks the situation for this firm will be relieved. Indications are that the greater part of the material used is for repair work rather than for the construction of new lines.

No price changes have been reported since the general increase of from 15 to 25 per cent about a month ago. Reports on collections vary considerably, one manufacturer stating that instead of his bills being met in thirty days, a large part of the customers were running over as long as ninety days. Other companies, however, gave a favorable reply to the interrogation as to collections.

Deliveries of Resistance Grids Lag

Producers Unable to Date to Fill the Demand Still Holding from Last Winter's Severe Conditions

Reports on market conditions for resistance grids, gained from a survey made among several of the large manufacturers, show a wide variance. One of the big producers stated that demand was moderate on the part of industrial plants, but that orders from electric railways were small. Other manufacturers, however, are at present experiencing a call for this material that is far in excess of available supply. This, they stated, was owing to the severity of the weather last winter, which caused an unusual number of grids to burn out on street cars, and traction companies consequently fell so far behind in replacing equipment that the situation has not yet returned to normal. This heavy call is in spite of the fact that summer ordering by these companies is usually rather light, and even at present seems to be mostly for maintenance work.

The estimated length of deliveries also covers a wide range, one company reporting ability to make shipments in small quantities of the railway type grid from stock. In general from about sixty to ninety days was quoted, although in the case of one producer a figure of eight months' delivery was given, as a result of the shortage of malleable castings. In spite of long delivery dates very few orders have been canceled.

The raw material supply has been materially impeding production, as orders for steel products at the mills are unfilled and transportation continues to tie up this class of goods in favor of coal movement. Nevertheless, one producer at least is running his plant far above its normal capacity of resistance grids, but other manufacturers less favorably situated report a subnormal output. This in part is probably due to labor troubles which the latter have experienced, as this factor is not everywhere affecting the situation.

Recent price increases are reported, ranging from about 20 to 30 per cent. Collections are said to be fairly good considering all present conditions.

Rolling Stock

Athens Railway & Electric Company, Athens, Ga., has received the five cars which it recently ordered. It is expected these will be used on the Prince and Boulevard lines.

Virginia Railway & Power Company, Norfolk, Va., has secured bids for the construction and delivery of twenty double-truck closed cars and ten closed trailers to cost $420,000. It has also secured bids for fifty safety cars at a cost of $332,500.

Western Australian Government Tramways and Electricity Supply, Perth, West Australia, has asked for bids on twenty 15-ton standard street cars in this country, supplied with air brakes, electrical equipment and accessories. Bids are open until July 29.

Franchises

Central California Traction Company, Los Angeles, Cal.—D. N. Carmichael, Commissioner of Streets, is in favor of revoking the franchise of the Central California Traction Company because the company has been negligent in the matter of attending to its tracks. Eighth Street is in a very bad condition, the double track never having been completed and the single line running on one side of the street. The company maintains that it cannot obtain the money for such improvement.

Track and Roadway

Calgary (Alta.) Municipal Railway.—The Calgary Municipal Railway, through its superintendent, R. A. Brown, announces that it will spend $172,646 this year on its railway.

Connecticut Company, New Haven, Conn.—John G. Lane, director of Public Works, announces that the work of widening and paving Temple Street will begin on Aug. 1. The Connecticut Company will remove the tracks from George Street to Congress Avenue. The cost of paving Temple Street will be paid by the Connecticut Company.

San Diego Electric Railway, San Diego, Cal.—The San Diego Electric railway company has made application to the State Railroad Commission for permission to build an additional track for the purpose of serving the terminal of the San Diego and Coronado Ferry company in San Diego. Heretofore this terminal has been served by a single track from the crossing of the Santa Fe railway tracks at Atlantic and Market Streets, but increased business at the ferry makes present facil-

ities inadequate. The improvement now being undertaken by the ferry company will involve the laying of about a quarter of a mile of new track by the electric railway company, and work is to start as soon as permission is obtained from the railroad commission.

Detroit (Mich.) United Railway.—It has been urged in a resolution to the Common Council that the Municipal Street Railway Commission enter into an agreement with the Detroit United Railway whereby construction on the St. Jean Street line will be completed.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway, through its general manager, announces that just as soon as the tracks are repaired the traffic on Thomas, Clayton & Laurel Streets will be continued. The matter of repair is awaiting the arrival of track equipment.

Eastern Massachusetts Street Railway, Boston, Mass.—The trolley tracks on the Essex Road of the Eastern Massachusetts Street Railway from Whipple's Corner to Whittier's Corner will be removed. Extensive alterations have already been started on the Brockton division of the Eastern Massachusetts Street Railway. The large brick carhouse at Campello will be turned into a repair shop for the entire district south of Boston, where it is said upward of $30,000 will be spent in installing machinery. The cars which formerly operated from Campello to the carhouse will now go to Torrey Street. To take care of this additional store of cars at Torrey street eight new tracks will be laid.

Cincinnati (Ohio) Traction Company.—On August 1 the Cincinnati Traction Company will begin the work of extending its Sixth Street car line to Fairmount.

Dayton (Ohio) City Railway.—President Grimes of the City Railroad will ask the County Commission for the right to construct a double track up Eaton pike to the west end of the Soldiers' Home.

Power Houses, Shops and Buildings

Danbury & Bethel Street Railway, Danbury, Conn.—The Danbury & Bethel Street Railway is purchasing electric power from the Danbury & Bethel Gas & Electric Light Company. Judge J. Moss Ives, receiver of the railway company, explains that this temporary agreement was decided upon because of the high price of steam coal.

Morris County Traction Company, Morristown, N. J.—The Public Utility Commission has granted permission to the Morris County Traction Company to sell its power house at Chatham, N. J., to Martin Nordegg for $18,000. The company is now receiving its power from the North Jersey Power & Light Company, the Morris & Somerset Electric Light Company and the Millburn Power Company.

Trade Notes

The Wagner Electric Manufacturing Company, St. Louis, announces the opening of a sales office and service station at No. 2007 South Ervay Street, Dallas, Tex., in charge of Charles O. Rauschkolb, branch manager.

The Coxe Stoker Sales Company, Maikle Bank Building, Hazleton, Pa., announces the appointment of Christian Schillinger, formerly engineer of steam equipment for the Delaware, Lackawanna & Western Railroad Company, as sales engineer, effective June 1.

Harold L. Hazeltine, formerly instructor of physics and electricity at the Trenton (N. J.) School of Industrial Arts, has become Eastern representative of the Sterling Varnish Company. He will make his headquarters in the New York district after Sept. 15.

The Granite City Electric Company, 21 Fifth Avenue, St. Cloud, Minn., has recently been incorporated to deal in electrical devices and supplies and also to repair and rewind motors and generators. William C. Johnson is president and business manager.

The Brown Instrument Company, Philadelphia, Pa., is building an addition to its plant costing $100,000, which will afford better opportunity to take care of its customers. The company has also added six salesmen to its force, one for each district office in New York, Philadelphia, Chicago, St. Louis, Pittsburgh and Detroit.

The H. S. B. W.-Cochrane Corporation, Philadelphia, successor to the Harrison Safety Boiler Works, has acquired a group of factory buildings, including machine shops, foundry and offices, at 3120 North Seventeenth Street. The new plant will be utilized by the company in connection with its standard power-plant equipment and specialties.

Samuel H. Taylor, general manager of the Electrical Railway & Manufacturers Supply Company of San Francisco, which is said to be the oldest jobbing firm on the Pacific Coast, was chairman of the business program committee at the recent convention of the Electric Supply Jobbers' Association, held at Del Monte.

The Arthur Power-Saving Recorder Company, New Haven, Conn., announces that it has received the order for power-saving recorders for all cars in the city of Ottawa, Canada. This installation follows extensive study of the power-saving situation by officials of the road on various properties in the United States.

The Electric Storage Battery Company, Philadelphia, announces the appointment of George D. Luther as soliciting agent in Seattle, Wash., with offices at 811 White Building. Mr. Luther joined the sales force of the Boston office of the company in 1907, and in 1910 he was made soliciting agent in Denver.

The Ohio Brass Company, Mansfield, Ohio, advises that its new foundry, which is under construction, is for malleable iron rather than for malleable brass, as was stated on page 1236 of the ELECTRIC RAILWAY JOURNAL, June 12 issue. The company name was also incorrectly given.

The Arthur Power-Saving Recorder Company, New Haven, Conn., has received an order for the equipment with its recorders of the London United Tramway. This is the second large trolley company in London which has placed orders for these recorders, the order from the London Metropolitan Electric Tramways, Ltd., having been mentioned in the issue of this paper for May 29. Both of these properties are controlled by the interests represented by Lord Ashfield, formerly Sir Albert Stanley.

R. T. Roth of Philadelphia, Pa., has recently become associated with Schweitzer & Conrad, Inc., as sales manager, with headquarters in Chicago. Mr. Roth was for a number of years connected with the Western Electric Company at the Philadelphia office. In 1910 he left the company to organize the Lewis & Roth Corporation, Philadelphia, construction engineers and manufacturers of high-tension equipment, with which he has been actively connected for the last ten years. He recently disposed of his interests in the Lewis & Roth Corporation. Mr. Roth's experience in the purchase and sale of electrical equipment has covered a period of twenty years.

New Advertising Literature

Grinders.—Charles H. Besly & Company, 118-124 North Clinton Street, Chicago, is circulating a large catalog covering the "Besley" grinders and accessories.

Electric Hammers.—Bulletin No. 4, issued by the American Electric Tool Company, Petersburg, Va., describes and illustrates the Paulero electric hammer, type A, form 1.

Electric Hoists.—The Northern Engineering Works, Detroit, Mich., have issued catalog No. 43, covering their type D electric hoists.

Lubrication.—The Vacuum Oil Company, New York City, has issued a thirty-two-page bulletin on "Bearings and Their Lubrication."

Portable Machinery.—Portable Machinery Company, Passaic, N. J., has published a twenty-four-page catalog entitled "Portable Conveyors."

Jacks.—The Duff Manufacturing Company, Pittsburgh, Pa., is distributing Folder No. 803, illustrating and briefly describing Duff and Barrett jacks of the types most widely sold.

Track Work.—The Balkwill Manganese Crossing Company, Williamson Building, Cleveland, Ohio, has published a bulletin under the title "1920 Supplement No. 1 to Standardized Specifications for Manganese Crossings which were issued in 1919."

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When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

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Manufacturers of
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"I believe in the Business Journals"

—Edward N. Hurley

In this concise statement, Mr. Hurley, President of the Hurley Machine Company, Chicago, formerly Chairman of the U. S. Shipping Board, and prior to that Chairman of the Federal Trade Commission, summed up the part the business papers can play in facilitating the economic distribution of materials and manufactured goods from one industry to another, in his speech before the Associated Advertising Clubs of the World at Indianapolis.

Mr. Hurley said:

"When I was Chairman of the Federal Trade Commission, I made it a point to have the principal trade papers in the United States sent to me regularly. These were read not only by myself, but by the entire staff, so that we might have a finger on the pulse of the country's industry.

"Advertising agencies placing national and international advertising could well insist on every man in their employ reading the trade journals of the industries of their clients so that they may keep themselves currently informed on the conditions in the businesses for which they are writing copy.

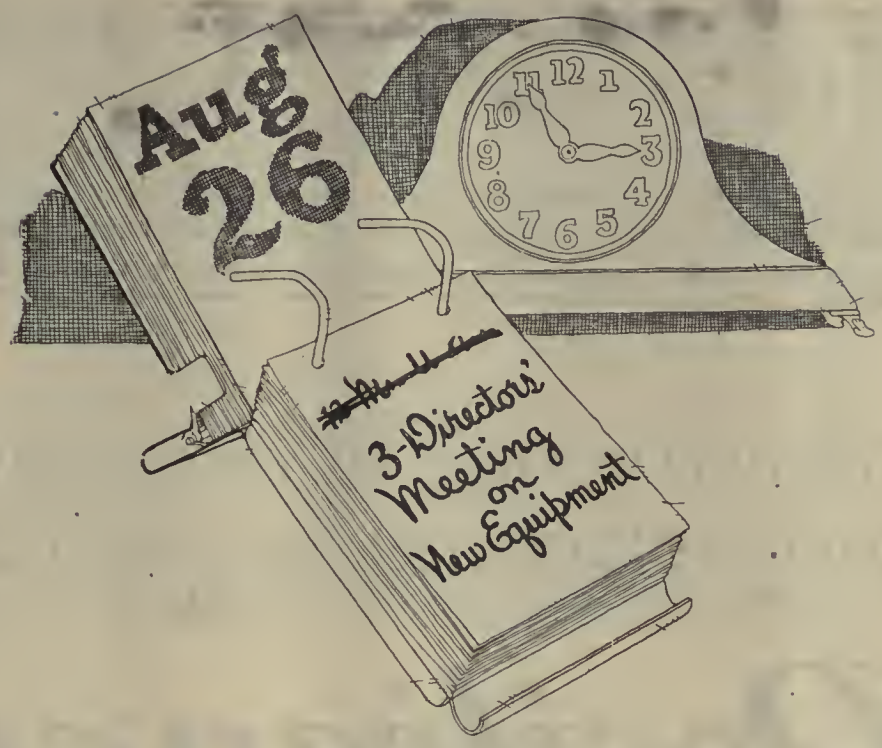
"I believe in the business journals. I have been closely associated with the work of many and have made a study of them, and I am firmly convinced of the editorial strength and value of many of these publications"

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McGraw-Hill Co., Inc.
Tenth Avenue at 36th Street
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H-12



What will this conference mean for you?

IN FIVE minutes—today or tomorrow—you will be called into conference to advise on some phase of your company's plans. In such conferences men are measured by their superiors. They are classified according to the breadth and scope of their knowledge.

How do the big men of business classify you? As a merely "technical man," sound on certain specialized problems but ignorant of the problems of business as a whole? Or do they think of you as a man whose knowledge covers every phase of business?

How one technical man became an executive

Many a technical man has found that technical training will carry him just so far; but for executive responsibility something additional is required.

Stephen B. Mambert, Vice-President and Financial Director of the Thomas A. Edison Industries, made that discovery. He was 25 years old when he entered the employ of Mr. Edison as an efficiency engineer. For two years he occupied that position.

Altho a college graduate, he realized that he needed a deeper knowledge of the fundamentals of all business, so he enrolled for the Modern Business Course and Service of Alexander Hamilton Institute.

Three years later, Mr. Mambert became vice-president, financial adviser and director in twenty active companies. When asked for a frank expression of the benefits to him of the Modern Business Course and Service, he gave us permission to quote him as follows:

"My appreciation of the Alexander Hamilton Institute Course is based not only upon the broad scope of its appeal and the close co-ordination of the subjects treated, but also upon the benefits that I have personally derived from following the Course."

Thousands of technical men who have moved ahead

The Alexander Hamilton Institute was founded ten years ago. The Institute has only one course. Its training is designed for the man who knows one department of business and knows it well, but lacks the all-round knowledge of the other departments.

To such a man it gives a working knowledge of sales, accounting, merchandising, factory and labor problems, office organization, advertising, costs and corporation finance—the sort of training in a few months which would require years if a man acquired it by practical experience in each department.

From the very beginning the Institute has had a special appeal to technically trained men. Of the thousands of men who have enrolled in its Course more than 11,000 are technical men. To their technical training they have added business knowledge, a combination which makes the very highest type of business executive.

11,000 *reasons why you should investigate*

The Alexander Hamilton Institute holds out no special inducements or appeals. It distinctly avoids the type of man who is merely curious, or who is weak enough to be over-persuaded.

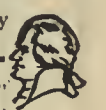
Its appeal is to the calm judgment of earnest, ambitious, clear-thinking men. Of such men it asks merely an opportunity to present the facts.

A training which has helped 11,000 other men of precisely your experience is surely worth an evening of your careful thought. We would like to tell you just what the Institute Course is, and just how it can make its value count in your success and earning power. The facts are contained in

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All your questions are answered in this 116-page booklet. It describes the Course in detail, and contains scores of letters from men who attribute their larger success to its help. There is a copy of the book for every thoughtful reader of this publication. Send for your copy today.

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Send me "Forging Ahead in Business" which I may keep without obligation.

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In the construction of new road-bed, an important factor to be considered is

Resiliency

A resilient road-bed is not only less noisy and more easy riding, but lessens wear and tear on equipment.

Dayton mechanical ties afford this resiliency so important in modern track construction. A cushion of asphalt is the shock absorbing medium. Result—Resiliency.

Build your track with no comeback.

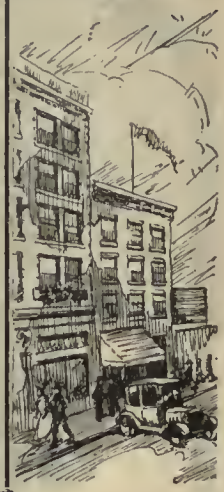
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TRAVELS TO TOWNS WHERE THERMIT INSERT RAIL WELDING TERMINATED TRACK TROUBLES





Thermit Insert Rail Welding in San Antonio



SAN ANTONIO



"Remember the Alamo" used to be a familiar slogan in San Antonio during its early struggles for existence.

"Remember San Anton's THERMIT track!" is now the slogan. The Thermit Insert Weld has been standard in San Antonio since 1913 and about 10,000 perfect welds may be seen there today. Less than one weld in two thousand, or one-twentieth of 1%, has broken during the six years that the process has been used.

Remember also to send for our Rail Welding Pamphlet 1232.

METAL & THERMIT CORPORATION
120 Broadway
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SERVICE STRENGTH THERMIT WELDING ECONOMY



"Next Stop, Los Angeles!"



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Good car cards keep advertisers satisfied because they produce increased sales.

Collier Service

is the concentration of the best advertising ideas and plans applied to car cards.

To the electric railway this means a regular monthly check which assures a permanent and steady income.

Collier Service is nation wide in scope. It reaches all and serves all

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The Fabrikoid Process adds beauty and long life to fabrics; some heavy and rugged, others dainty as linen—all pliable, scuff-proof, stain-proof and water-proof

DU PONT FABRIKOID



—ideal for the "smoker"

YOUR upholstery will wear longer, it will not show stains or the marks of feet on the cushions, it will not fade or grow lustreless—if it is Fabrikoid.

And Fabrikoid makes comfortable upholstery, for it is always soft and flexible. It is completely sanitary. You can cleanse it of all grease and dirt with soap and water.

From the standpoint of economy, Fabrikoid is unsurpassed. It is low in first cost and it *stands up* under the most severe service.

Send for samples and complete information.

DU PONT FABRIKOID CO.
WILMINGTON, DELAWARE

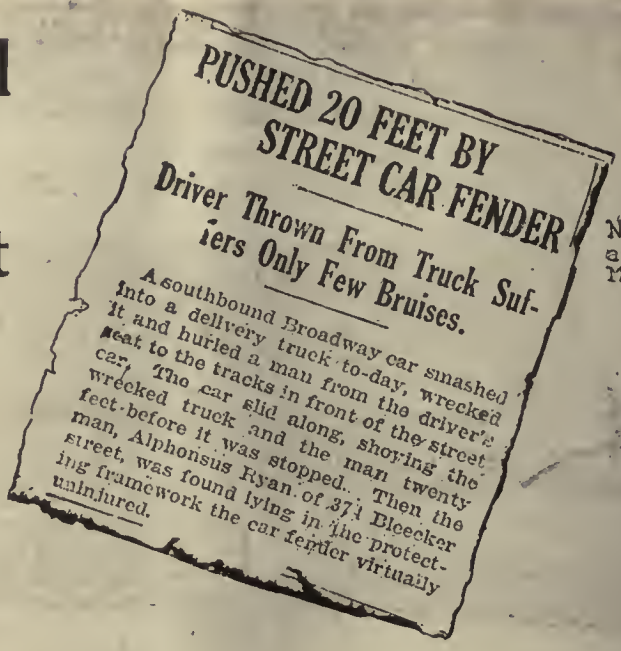
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This Accident will not worry the claim department

Why?



PUSHED 20 FEET BY STREET CAR FENDER

Driver Thrown From Truck Suffers Only Few Bruises.

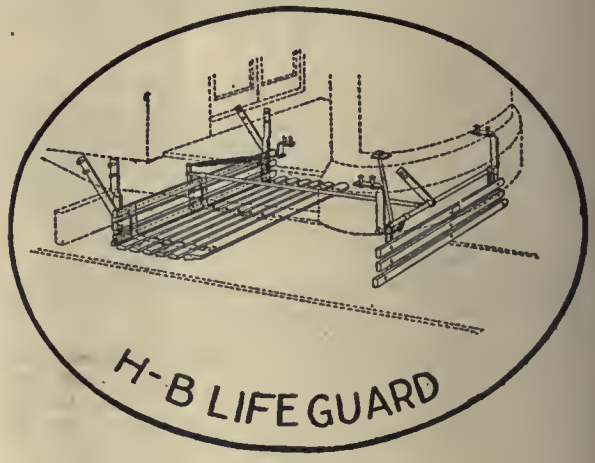
A southbound Broadway car smashed into a delivery truck to-day, wrecked it and hurled a man from the driver's seat to the tracks in front of the street car. The car slid along, shoving the wrecked truck and the man twenty feet before it was stopped. Then the man, Alphonsus Ryan, of 371 Bleecker street, was found lying in the protecting framework the car fender virtually uninjured.

New York Sun and Herald May 24, 1920.

H-B LIFE GUARDS
Were On This Car



H-B Life Guards are positive in operation. The instant the gate in front is touched, down goes the life guard, picking up and carrying the person safely until the car is stopped. They are the best prevention for front end accidents.



Specify H-B Life Guards on your safety cars and protect the public. It means fewer claims in the long run.

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agent
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61 Broadway, N. Y.

For Cool Turbine Bearings

A continuous supply of re-cooled oil maintained at the proper temperature to most effectively absorb the heat generated in both turbine and engine bearings is essential for efficient operation.



S & K

Oil Coolers For Bearings

excel in cooling efficiency due to the contra-flow principle and correctly designed baffling employed in their construction.

The oil travels in a zig-zag course across the nest of tubes through which the cooling water passes.

A patented external packed joint safeguards against leakage of water into the oil. Should a defect in the packing occur after long service the seepage comes to the surface where it can immediately be noticed and duly corrected.

The coolers are perfectly accessible for cleaning. They will operate equally well in the horizontal or vertical position.

Interesting data, concerning their application to your plant conditions, furnished on request.

Write for Catalog No. 12-G.

Such coolers have proven very successful as air coolers and with slight modification as distillers. The capacities of "Z" type coolers range from five gallons to five hundred gallons a minute.

Valves
Injectors
Condensers
Spray Nozzles
Chemical Equipment

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Steel Tired Wheels

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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Ghee

Natives of the East Indies use a kind of butter which they call ghee.

It is made from thickened milk, and when properly prepared keeps sweet for a long time.

But let an amateur design a gob of ghee and the consequences border on the fearful.

Instead of remaining sweet the poorly prepared ghee generates a high tension perfume that is second cousin to chloroform.

Thus with brushes.

The ingredients in Morganite brushes, made the Morganite way, produce a super-superior brush.

But let some cheap brush makers you know of try to handle the self same ingredients and—

Holy Ghee!



Morganite Brush Co., Inc.

Main Office and Factory: 519 West 38th St., New York

DISTRICT AGENTS:

Lewis & Roth, 13th and Wood Sts., Philadelphia

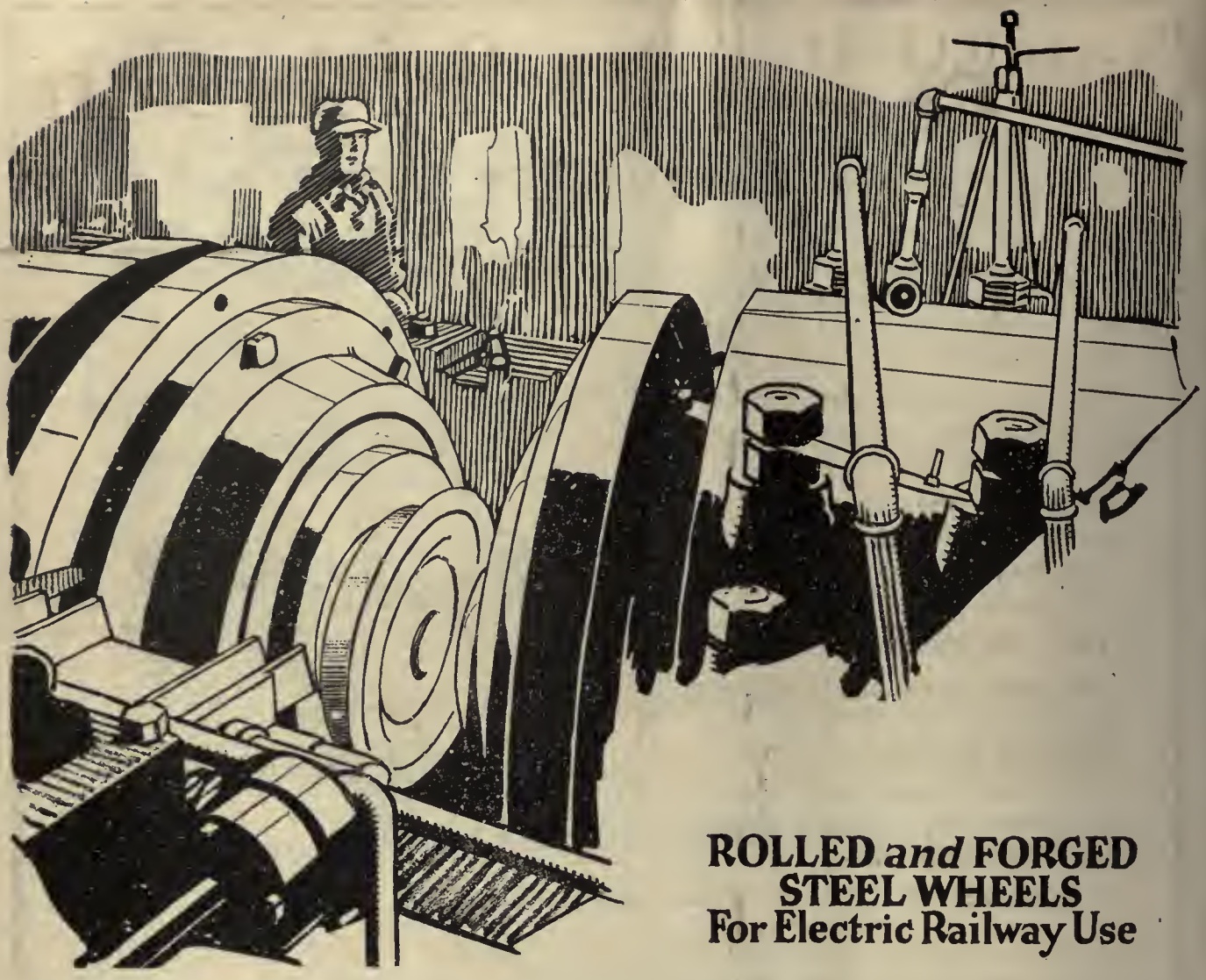
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THE reasons why steel wheels made by our improved methods give superior service are numerous. Let us tell you the story in detail. Then ask the opinions of satisfied users.

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Osgood Bradley Safety Cars
Are Handsome Cars



No reason at all, we thought, why a car only 27-ft. 9⅞-in. shouldn't be designed with handsome outlines.

Consequently, the vestibules of the Osgood Bradley Safety Car received 6 in. more crown to avoid that chopped-off appearance that has been a needless handicap to an excellent thing.

This deeper setting also allows a better arrangement of the control equipment and gives the car operator a wider view through the right-hand side window.

While this form of vestibule is one of the most apparent improvements in the appearance of safety cars, the building up of the side frames and roof on jigs and the extra-strong trussing of the car structure as a whole are less obvious but equally important factors in this production of a clean-lined safety car. Osgood Bradley Safety Cars are Long Life Cars.

Builders of City and Interurban Cars

OSGOOD BRADLEY CAR COMPANY

Builders to Two Generations of Electric Railway Men

WORCESTER, MASS.



STEAM TURBINES

For Continuous Operation
—24 Hours per Day—

Efficient, Reliable, Durable
and Easily Accessible
for Inspection

Sizes from 200 k.w. up.

Allis-Chalmers Mfg. Co.
Milwaukee, Wis.
Sales Offices in all Large Cities

Do You Like to Think?

The average man does, but he doesn't want so many details to think about that they will cause worry.

Install the one Nuttall Union Standard Trolley base that suits your service, let it do its work, think about how well it has done it then install, as your judgment will direct you, as many Nuttall Bases as you need.

You'll think thoughts of satisfaction after that because there is no rapid deterioration to worry about.



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R. D. NUTTALL COMPANY
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A PROVEN SUCCESS



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CYPRESS

"THE WOOD ETERNAL"

is its **high resistance to decay.** (Specify "All-heart Tidewater Cypress"—every piece identified by the above trade-mark as the product of a responsible *Licensed* Assn. Mill.)

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The Railway Signal Association makes its recommendations as a result of definite **knowledge,** and its membership includes many able men who are Cypress enthusiasts. We gladly refer any doubter as to Cypress superiority to any well posted engineer who has had experience with "The Wood Eternal."

The same service conditions which make Cypress superior for "Trunking and Capping" are present in many other railway lumber requirements, such as

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and similar purposes where the material is exposed constantly to the weather and **high resistance to decay is essential.**

If railway men in general will study the question of wood durability for other uses as carefully as Railway Signal men have studied it there will be a lot more all-heart Cypress used in railway service—**to the very great economy of the companies using it.**

Our data is at your service.

Will you write us? We will reply frankly.

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The Brady Brass Company is the original manufacturer of the soft bearing metal known as Cyprus Bronze, which is now being used in almost every country of the world for

Engine Castings, Railway Journal Bearings and High Speed Motor Bearings

It is more generally known as M. C. B. Grade "A" Specification.

The original formula was developed by this company after a railroad experience of more than two score years, and from an economic standpoint—high in lead and low in tin contents—continues to meet with great favor.

Today we are selling Cyprus Bronze metals, M. C. B. Grade "A" Specification, wherever railways are operating. This has been made possible by the building up of a splendid organization of trained men, located in an up-to-date plant at tidewater of such a capacity as to insure prompt deliveries anywhere.

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That thought means write to the Quality Shops and find out what their One Man Lightweight Safety Cars can and have done.
We'll be glad to tell you, and you'll be glad to hear it.
Don't be a "might have been," but write now and be in right with the public.

St. Louis Car Company

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Diamond "S" Steel Back is the Best Type



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"Think SEARCHLIGHT *First"*

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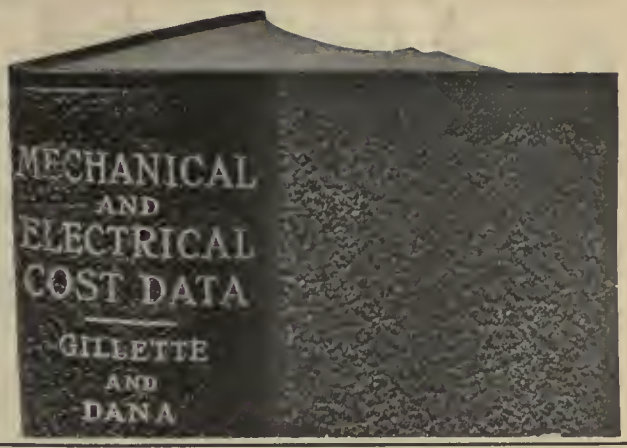
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ELECTRICAL MATERIALS



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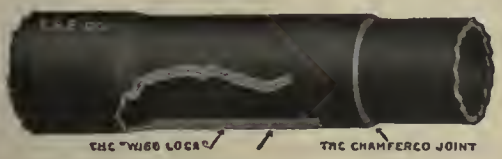
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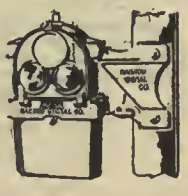
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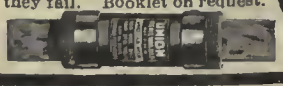
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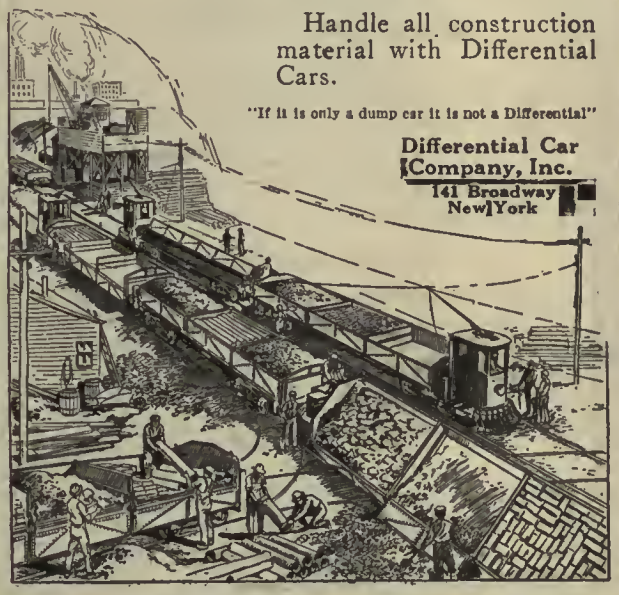


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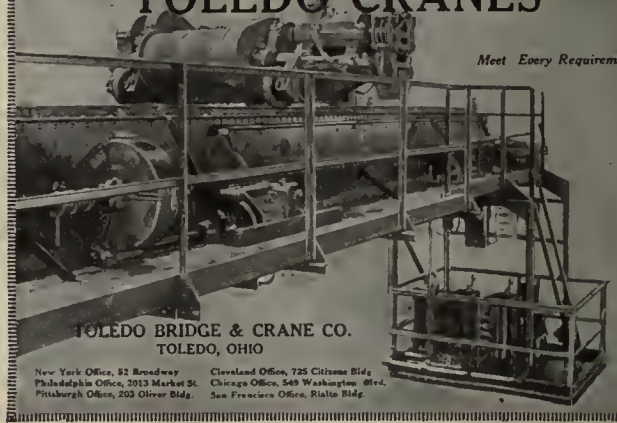
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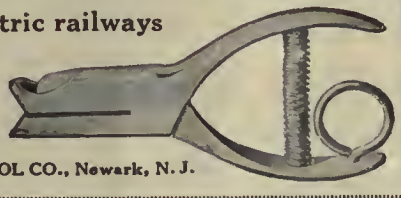
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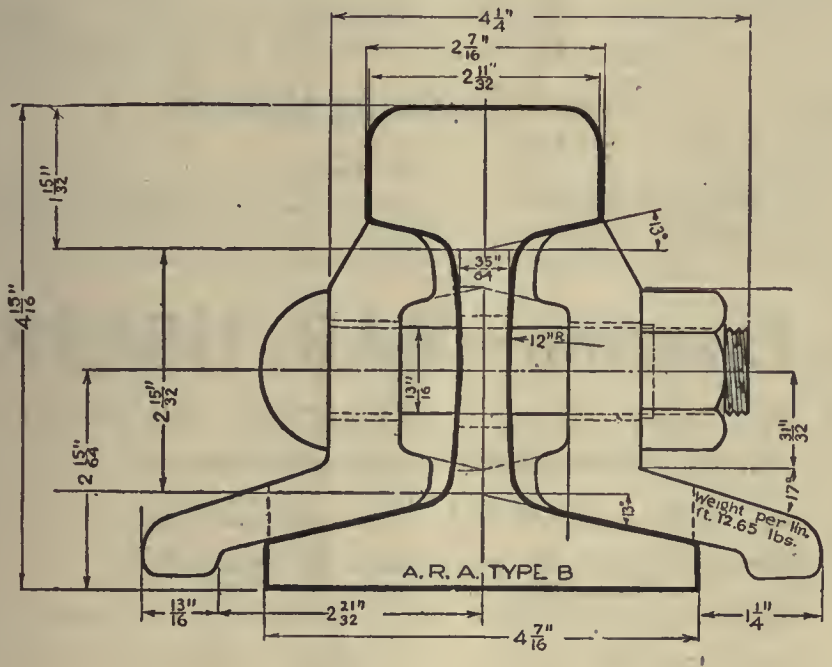
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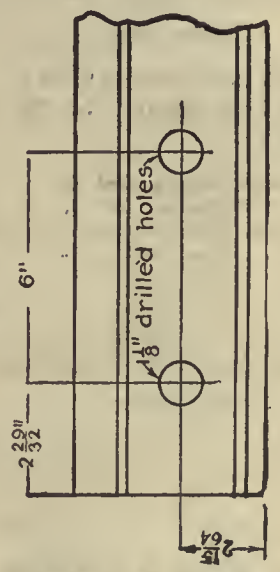
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Oxweld Acetylene Co.

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

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Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
Johns-Manville Co., H. W.

Batteries, Storage
Electric Storage Battery Co.
Johns-Manville Co., H. W.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brady Brass Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Boiler Cleaning Compound
Johns-Manville Co., H. W.

Boiler Coverings
Johns-Manville Co., H. W.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Oxweld Acetylene Co.
Rail Welding & Bonding Co.

Bonds, Rail
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

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McGraw-Hill Book Co.

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Niles-Bement-Pond Co.

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Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

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Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Ackley Brake & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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Safety Car Devices Co.
St. Louis Car Co.
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Green Engineering Co.

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American Bridge Co.

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Zelnicker, W. A., Supply Co., Inc.

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General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brushes, Graphite
United States Graphite Co.

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Columbia M. W. & M. I. Co.
Eureka Co.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

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Differential Car Co.

Cars, Passenger, Freight, Express, etc.
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Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
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National Ry. Appliance Co.
Osgood Bradley Car Co.
St. Louis Car Co.
Wason Mfg. Co.

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Electric Equipment Co.

Cars, Self-Propelled
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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
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Catchers and Retrievers, Trolley
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car (See Headlining)

Checking
Industrial Protective Co., The

Circuit Breakers
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.
Eureka Co.
General Electric Co.
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Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Brill Co., The J. G.
Ohio Brass Co.

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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

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Diamond Mfg. Co.
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Portable Machinery Co

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Conveyors, Portable
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Copper Clad Steel Co.

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Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

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Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

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Ohio Brass Co.
Westinghouse Trac. Brake Co.

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Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Creosote and Creosoting
Barrett Co., The

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International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

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Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

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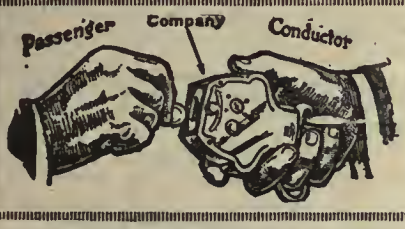
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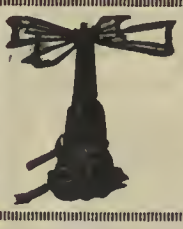
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Johns-Manville Co., H. W.
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Bush Electric Co.

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Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter.

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Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

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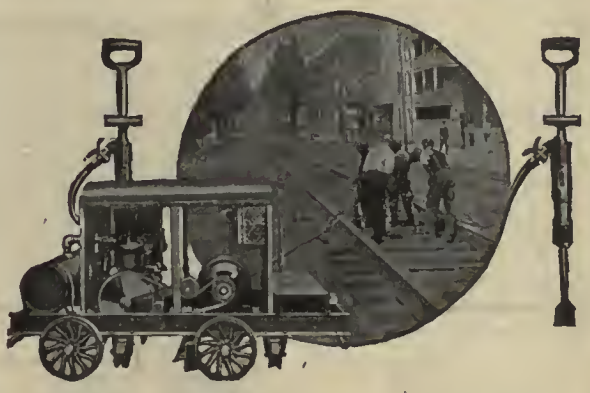
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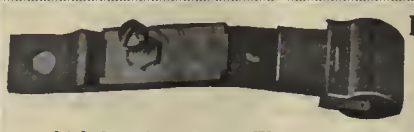
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PS HEATERS

Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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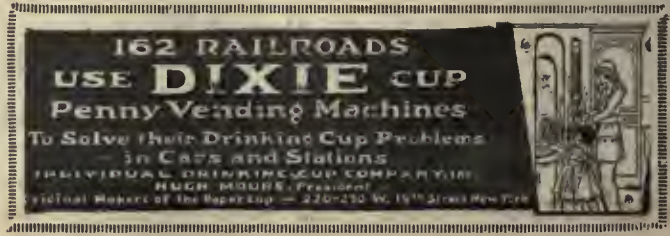
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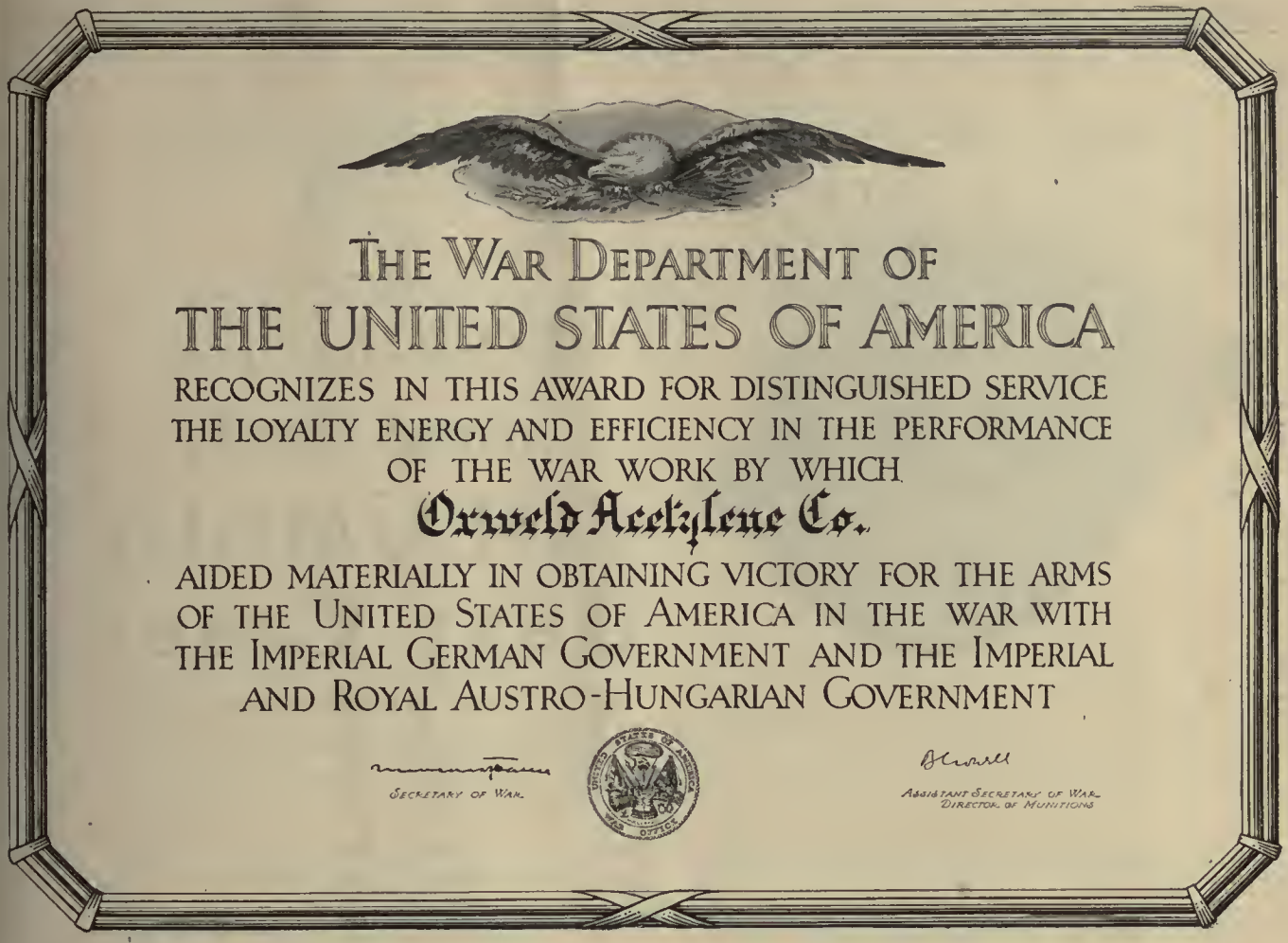
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The great Oxweld organization which kept Uncle Sam steadily supplied with welding and cutting apparatus during traffic-tied days of war is once more devoting its entire energies to the needs of welders and cutters throughout America.

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Steadiness and smoothness of riding action are rather essential features of Brill 79-E, the Standard Birney Safety Car Truck.

The long 13-ft. spring base of this truck and the fact that 75 per cent of the supported weight is borne on coil springs, swing-linked to the ends of the quarter-elliptic springs at the four corners give a most comfortable riding truck. But the Trunnion Device over the pedestal at diagonally opposite corners, connecting the truck to the carbody, gives increased firmness to its longitudinal direction and relieves pressure on the journal boxes in starting and stopping, thereby eliminating resultant uncomfortable vibrations and making unnecessary the use of pedestal wear plates.

This device is fully described in our Bulletin No. 242.



THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

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Electrification is the one answer to economical freight haulage on grades over heavily traveled trunk lines.



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ELECTRIC RAILWAY JOURNAL



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Reading Reversible Rail Bender does the work of two benders of any other type.

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"Joe," said the Vice-President to his Manager of Operation, "I have carefully studied your report and recommendations for fighting snow next winter and want to tell you I agree with everything you say. There is no question at all about the economy of providing durable and reliable equipment on the snow-fighting machines. The performance of Westinghouse No. 310 motors and HL control on two of our plows proved this last winter, so go ahead and place the order for them."

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East Pittsburgh Pennsylvania

1143

Vol. 56, No. 5 New York, July 31, 1920 *Pages 201-252*

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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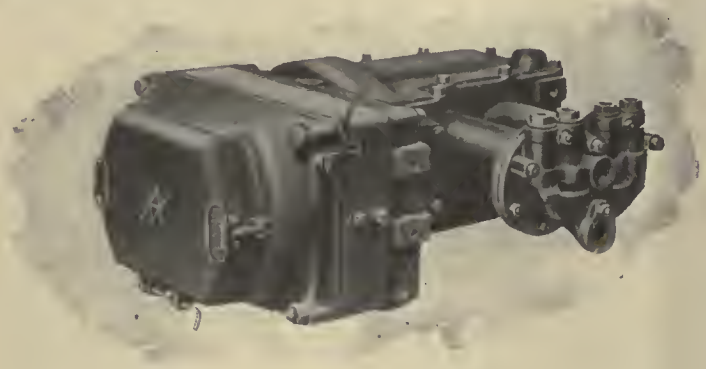
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Advertising Indexes—Alphabetical, 52; Classified, 46, 48, 50; Searchlight Section, 42-45

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Familiar Type of "Bungalow" Air Compressor



More than 2,287 "Safety" cars, now running on 109 different electric lines throughout the United States, are equipped with "Bungalow" air compressors

Westinghouse Traction Brake Co.

General Offices and Works,
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Typical "Safety" Car

OFFICES:

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Safety Cars Mean Ideal Trolley Service

Not only a satisfied customer but also the *advertisement* of a satisfied customer is the best advertisement. Read this and be convinced.

THREE-MINUTE TROLLEY SERVICE

Safety Cars are now being operated by the Connecticut Company from Wentworth and North Main Streets to State Street, around the Plaza, through Water to Golden Hill, Golden Hill to Main and thence to Wentworth.

This three-minute headway gives the people in the North Main Street section ideal trolley service.

The Safety Cars are the safest, most reliable, fastest, and most convenient means of transportation in Bridgeport.

Passengers will please pay as they enter on trips from Wentworth Street to the center of the city. When going north bound passengers will please pay as they leave.

North-bound cars loop the Plaza, and can be boarded in State, Water or Golden Hill Streets.

THE CONNECTICUT COMPANY

(Reproduced from the Bridgeport Evening Post.)

The Connecticut Company knows whereof it speaks so highly. Its experience on the Oak Street Park Avenue line in Bridgeport proved clearly to the management that the Safety Car is the one best bet to give more service at less cost. Note that these cars are on Main Street, which *is* the main street!

These Connecticut Company Cars are Safety Cars Because

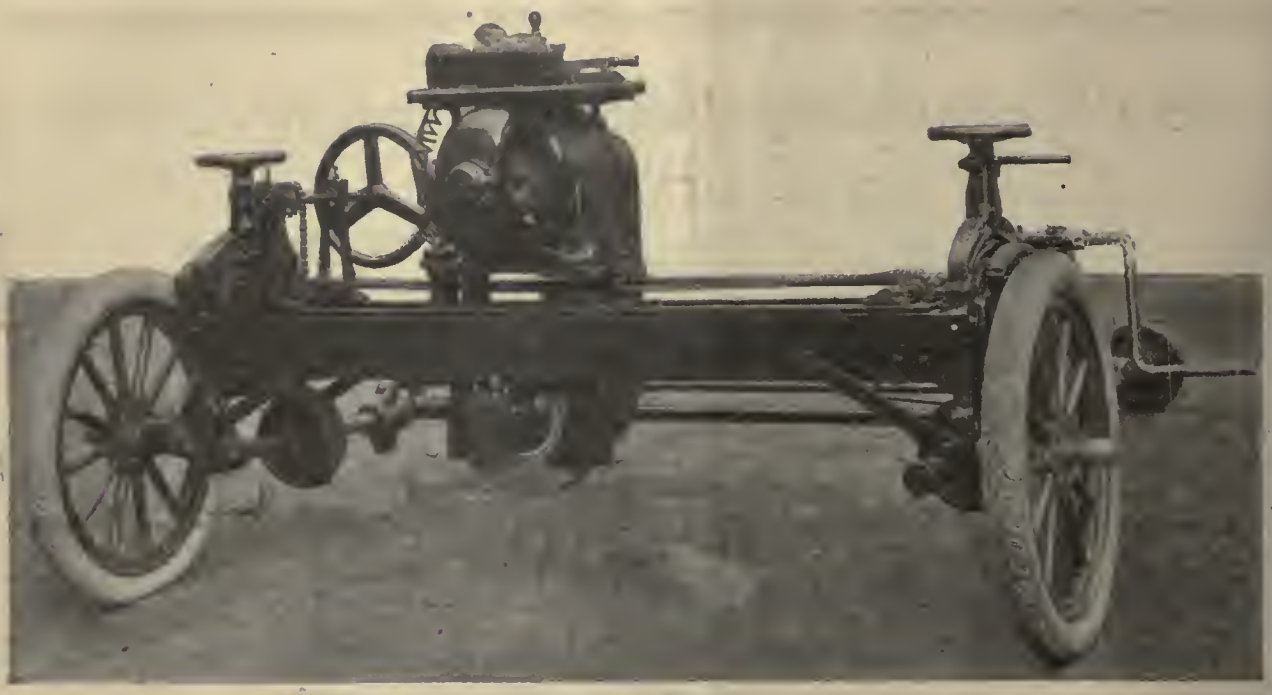
they are equipped with automatic, laborless apparatus, so interlocked that regardless of the illness or distraction of the operator the power will be cut off instantaneously, the airbrakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, they are Safety Cars only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

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Universal Rotary Track Grinder

A Direct Drive Motor

Is mounted on a hinged plate. The drive is direct to the grinding wheel, making it impossible for drive to get out of alignment. The tightening of belt is accomplished by the adjustment of one bolt only. To insure a gradual run off, an adjustment, at either end of the machine, for raising the grinding wheel clear, has been provided.

The Universal Rotary Track Grinder

Besides being manufactured of the finest materials, also distinguishes itself with the following features:

1. **Large Pneumatic Derail Wheels**
2. **Outboard Bearing on the Grinding Wheel Arbor**
3. **A Grinding Wheel that may be tilted to meet any angle of the rail head**
4. **Adjustable Outrigger**
5. **Easy adjustment of all parts**
6. **Easy operation**
7. **Low working economy**

We also make the "Atlas Rail Grinder" and "Reciprocating Track Grinder"

RAILWAY TRACK-WORK CO.

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Half Your Bonding is Done At the O-B Factory



To make your bonding easier, each detail of O-B Arc Weld Bond, each detail of O-B Resistance Welder was planned to save time and trouble at every track joint.

In the O-B Bond this is accomplished by the 90° welding angle, the "steel to steel with steel" welding, the steel sleeve which completely surrounds the copper terminal.

The safety control panel does it on the O-B Welder.

An automatic circuit breaker obeys a push switch in the operator's hand. He controls the machine absolutely by a push of his thumb. He works rapidly—unhandicapped. In case of overload or short circuit the breaker opens automatically.

Send for "Electric Arc Weld Bonding."

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Manufacturers—Trolley Materials; Rail Bonds; Car Equipment Materials; High Tension Porcelain Insulators; Third Rail Insulators.



O-B Type AW3 Bond (Pat.) Ball of Rail



O-B Type AW2 Bond (Pat.) Base of Rail



Phono-Electric

"What a true line," any line engineer will say on examining the overhead work of the Pennsylvania's 11,000-volt Philadelphia-Paoli electrification.

And it will stay true for years to come, despite the almost incessant pounding from the current collectors of high-speed trains, because Phono-Electric trolley wire is a contact wire that is stiff enough to stay in line and hard enough to take the wear.

Bridgeport Brass Company

Bridgeport Connecticut

2014



If Wood Ties Cost Nothing, Steel Twin Tie Track Would Be Lower in First Cost

THE elimination of nearly half the concrete usually put in the Track Foundation produces a saving so large that it is hardly affected even if the wood ties in the comparative estimate are considered as *worth nothing.*

The difference in the track trench dimensions required for wood ties and those of the Steel Twin Tie Track designs show an actual difference of 50 per cent. The present cost of the concrete that is eliminated by Steel Twin Ties at Fifteen Dollars a cubic yard amounts to *Twelve Thousand Dollars for a mile of Single Track.*

To save money in your track maintenance, figure concrete yardage; its cost; and compare bearing values on the concrete and on the subsoil. Over One Hundred Prooerties have decided that the answer is STEEL TWIN TIE TRACK.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



Standard Equipment on 90% of Street Railways
99% is our goal—

Four More Months in which to

reclaim or utilize worn rails, and badly damaged special work.

This is ample time to build up the worst of your low joints, hard center frogs and broken switch pieces before winter sets in, provided you use the Indianapolis Portable Patented Electric Welder.

"The Greatest Aid of the Way Engineer."



"Apex" Joint
for Guard and Girder Rail

Indianapolis Portable Patented Electric Welder

Get our prices on Solid Manganese Crossings

For open track construction use "STAY PUT" steel faced copper bonds which can be applied with "INDIANAPOLIS WELDER"

INDIANAPOLIS SWITCH & FROG CO.
SPRINGFIELD, OHIO

SHELBY POLES

Genuine "Shelby" Seamless Cold Drawn Trolley Poles

In the design of the Shelby trolley poles, minimum weight combined with ample strength is secured by the use of a reinforcement on the inside and at the base. This reinforcing member being made integral with the pole and of the same 13 gauge selected grade open hearth steel.

The Shelby pole is made in two designs—Standard A, for all ordinary service and the lightest pole it is practicable to manufacture or use—Standard B, with long reinforcing, intended to meet the most severe service conditions.

Special designs made to meet special requirements.

A new booklet just off the press gives specifications in detail and describes the method of testing these poles before they leave the mill.



ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

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17th and Cambria Streets

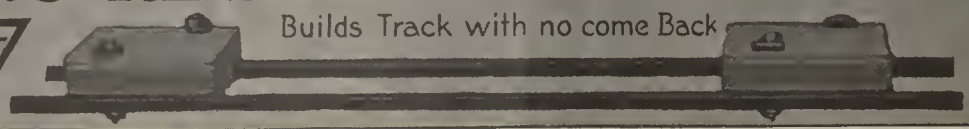
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50 Church St.

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Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

The RESILIENT RAILWAY TIE

Builds Track with no come Back



Concrete was never accused of having the property of

Resiliency

yet as a track foundation "it has its points."

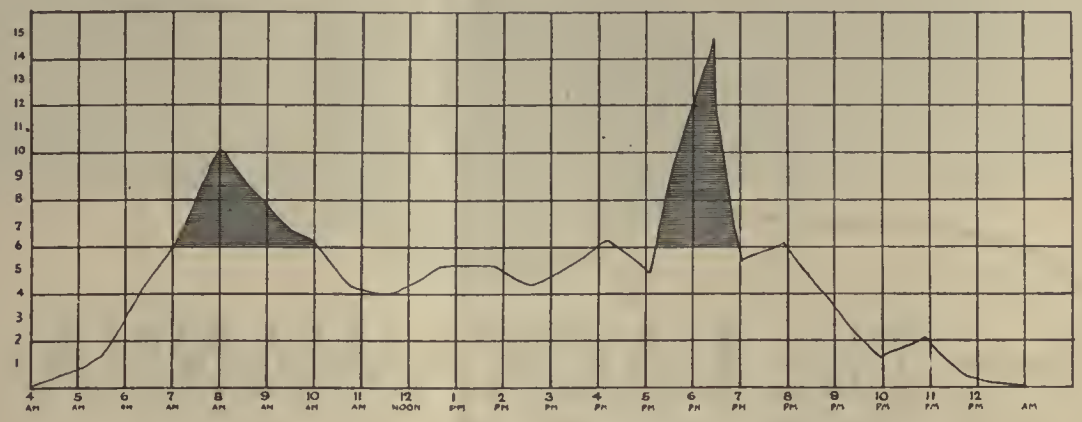
You can put resiliency into this most excellent of road beds by the use of Dayton mechanical Ties.

The Asphalt cushion in this Resilient tie dissipates the shock of heavy traffic, and makes riding on concrete as easy as on pneumatic tires.

It's the Tie that does it.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

This Curve Means Train Operation



Standardize! *Pneumatize!*

Not for all day, of course, but for the heaviest part of the day.

Take the figures of passengers per car-mile hour by hour and observe the enormous fluctuations in the course of the day.

It would be *wasteful* to run big cars or trains during the hours when the average is below 5 to 6 passengers per car-mile.

But it would be wisdom to supplement your small cars by big-car or train service when traffic has to be moved over limited track facilities during the hours of top density.

Save your big cars for heavy traffic but be sure to equip them with National Pneumatic equipment to

Make Your Peak Periods Produce
Maximum Profit and Efficiency

National Pneumatic Company, Inc.

50 Church St., New York Edison Bldg., Chicago

Works: Rahway, N. J.



The LACKAWANNA Safety-head Angle Bar

and what it prevents

Did you ever examine a lot of broken angle bars to see what are the most common characteristics of the breaks?

Here is what you are most likely to find:

—that the breaks usually start at the top of the bar at the center;

—that there is marked wear at the points where the under edges of the rail heads have been forced into contact with the bars under load;

—that there is a slight rib in the head of the bar at the gap between the rails.

The wear is only what is to be expected with ordinary construction. Also the center rib is not only the part left free from wear by the gap but will probably show slight indication of "upsetting." The latter is due to the longitudinal action of the rails caused by contraction and expansion and by wave motion of the track under rolling wheel loads.

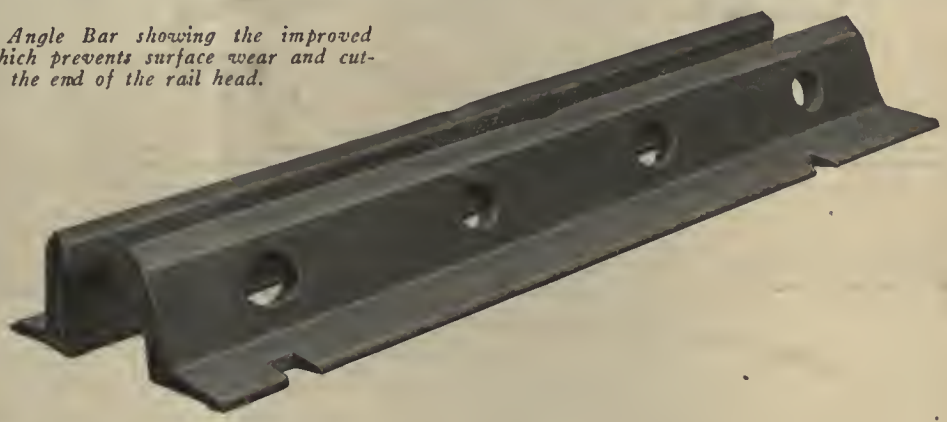
Together these faults wear away the surface of the ordinary angle bar at the center and take much of the strength out of the surface metal—and once the surface is weakened the whole strength of the bar is weakened, for as we all know when surface metal is broken the inside of any metal bar breaks much easier under tensile and cross stresses.

The action of the wheel load in passing over the joint is to alternately compress and pull apart the metal at the center of the bar, until, when the metal can no longer resist, the break occurs. Ordinary angle bar construction is therefore doubly weak in that it *invites* wear and concentrates that wear *at the worst stressed location in the bar.*



The new patented Lackawanna construction is the only one that goes right after this trouble with design correction. The bar metal at the rail gap is depressed about ⅛-inch, the depression tapering back about half an inch from the rail ends. This depression is put into the hot metal while the bar is being made and is merely a change in the section *without decreasing the sectional area.* All of the strength of the rest of the bar, both as to skin hardness and metal section, exist at the depressed location,

Lackawanna Safety-head Angle Bar showing the improved Safety-head depression which prevents surface wear and cutting underneath the end of the rail head.



and, as the sharp under edges of the heads of the rail can't dig into the bar metal, the original strength of the bar is retained; the metal is not continually ground and cut away.

That this is more than mere theory and that the depression in the bar head is a protection and a source of saving and security is being demonstrated continually wherever Lackawanna Safety-head Angle Bars have been installed.

If you are interested in making your track more dependable, avoiding track accidents and the losses and delayed schedules therefrom, if you want to reduce your labor and material costs on track maintenance and simplify your track inspections, the Lackawanna Safety-head Angle Bar offers improvements too good to neglect.

We also make plain fish plates with top and bottom depressions at the center to afford the same advantages.

Let us quote and submit performance data.

The Lackawanna Safety-head Angle Bar is *your own section* made break-proof

Other Lackawanna Aids to Better Track

The Lackawanna Deseaming Process

to which all our rails are subjected, leaves the rail head and base free from the cracks and weak, streaky, laminated, partially decarburized metal that under the ordinary manufacturing processes is an inherent cause of undue surface wear and rail fracture.

Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

Lackawanna Track Bolts and Spikes



Our track bolts and spikes, of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate



strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects the rail ends from battering and breaking down.

The hard steel and combination of reversing flange with the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets, and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our booklets, "Lackawanna Deseamed Rails," "Lackawanna Improved Track Appliances," and "Lackawanna Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York.

498

Eternal Vigilance

TWO railway managers were overheard recently in conversation about Fare Boxes. One of the men stated that he was sure the Boxes on his system were adding 5 percent annually to the normal passenger receipts. The other admitted that his company had picked up 8 percent additional revenue during the first year of FARE BOX operation but said the results had not been so favorable since.

What was the reason for this discrepancy between the two properties? It developed that the manager who was continuing to get substantial benefits from FARE BOXES had an *efficient follow up system through inspectors riding on the cars,* while the other expected the Boxes to give results without such inspection.

We have heard this experience repeated on so many properties that we have laid down for our customers this axiom:

FARE BOXES TO GIVE MAXIMUM RETURNS MUST BE FOLLOWED UP WITH A RIGID SYSTEM OF INSPECTION

It is interesting to note the care with which a railway company will safeguard the handling and accounting of money after it reaches the treasurer's office—and to contrast this with the indifferent methods prevailing on many properties as regards the collection and turning in of receipts from the cars.

A word to the wise should be sufficient. Experience often teaches a helpful lesson. Therefore, we cannot urge too strongly that *railway managers using our* REGISTERING FARE BOXES *should maintain a constant check upon their cars to see that fares are properly deposited and registered.*

Johnson Fare Box Company

Chicago
4619-4625 E. Ravenswood

50 East 42nd Street
New York



The Essence of Galena Service

EDUCATION in the use of "the right oil in the right place" is good in itself, but the value of the lesson is lost unless the *right oil is used.*

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Lubrication No Longer Guess Work

A STUDY of Prof. Upton's article on lubrication in this issue leads to the conclusion that we can always improve our methods and practice.

Not many years ago lubrication simply meant "flood her" with any kind of oil or grease. It meant, for instance, big bearing boxes with a great amount of oil waste, which was thrown away as no good after being used a short time. We were not pinching the pennies so closely.

Now we can reclaim the dirty waste, filter the oil and spend thousands on bearing designs—even use ball and roller bearings—and still find such refinements profitable.

Good lubrication means decreased maintenance and less depreciation. Good lubrication is a function of the bearing and of the lubricant used, and all the recovery processes may not decrease maintenance if the wrong kind of lubricant was used originally. We can't afford to say, "Oh, well, we have been using this oil and that grease for years and it's all right" unless we are sure there isn't something better and cheaper on the market. Lubrication is only one item which proves that every detail of a business must be studied with care by the operating engineer.

What Mean These Jitney Fights?

WHAT is the place of the automobile public service vehicle? We have had many papers and reports on "automobile competition" and "motor truck competition." Have we had any on "how to use the motor vehicle" or "motor truck co-operation"? We set ourselves up as transportation experts, but most of our energies with reference to the question of the motor vehicle are devoted to arguments to show its impracticability. At best we reluctantly admit a limited subordinate field.

Is this the manner in which to approach the question? Or should we not be the first to prove, by using this agency ourselves, exactly where it fits?

Most of us remember the trials of the cables and later the electric cars to get a hearing as possible agencies in the field of local transportation. We believe it was Sir William H. Preece who said in testimony before a committee of Parliament that Edison's plan to operate electric lamps in multiple was impracticable for "demonstration shows (it) to be hopeless and experiment has proved (it) to be fallacious." But such difficulties to be overcome merely added zest to the work.

In the present issue we are presenting the last, and what we hope will prove to be a very useful, installment of Mr. Jackson's "The Place of the Bus" series. Using data therein contained, who are better qualified to place the passenger bus in its rightful sphere of usefulness than the managements of electric railways? Similarly, who are more able to place the motor truck in the interurban field or as a feeder system than these same managements?

If the public service motor vehicle has a place—and we sincerely believe it has and will continue to have a place—in the transportation field, we believe the electric railway organizations will be woefully lacking in the recognition of their duties and opportunities if they do not take the initiative in the work of placing the bus and truck in their proper spheres with relation to service by rail.

Dealing in Figures

CAR design is as old as the railway industry, and perhaps we expect too much when we predict an age of standardized cars, for past history does not encourage such a prophecy.

With the many designs available we read with interest of the offer of prizes by the London County Council for a new car design for that system. When conservative England takes such steps there is evidence of dissatisfaction with present designs, or at least hopes for a better one. Then, again, there is food for thought in the remark of a prominent motor bus engineer that street cars are defective because they are designed to be as strong as possible, not as weak as possible. The successful use of the safety car for certain traffic conditions shows that there are reasons for this statement.

As we have many times pointed out, a considerable number of the benefits which would come from complete standardization will result if certain parts or dimensions, such as roof contour, spacing between side posts, etc., are standardized. When the electric railway industry uses only about 10 per cent of the car wheels manufactured and yet has more than 360 different types of wheel, there, at least, seems to be opportunity for more standardization than now exists in railway equipment.

How's This for a Shop Slogan: "Do It Mechanically"?

THE electrical companies throughout the country have adopted as a catch phrase, and it is a good one, the words "Do it electrically." It is a challenge to every prospective or possible user of electricity to apply it for lighting, heating and power production, in preference to other means or in addition thereto. In the shops and elsewhere on the electric railway properties of the country there are still many operations being performed by hand that could be done much better and cleaner by machines. It would be well, therefore, for the master mechanic, the roadmaster and others to paraphrase the above expression to the form: "Do it mechanically." There is possibly less need for a reminder of this kind now than there was some years ago, because it is so difficult and expensive to keep good

mechanics that a mechanical device is a godsend if it is reasonably effective.

This reminder is needed less by the master mechanic or roadmaster than it is by the man higher up, who holds the pursestrings and who "has to be shown" when a requisition for a new tool or other device is put through. To the latter we say that good maintenance in these days means good equipment, much of which will pay for itself in short order. The writer was impressed in one shop lately visited by the close adaptation of the tools to the work to be done. He was not surprised, therefore, to hear the master mechanic in charge say that he believed in using the best tool available in performing each shop operation. There is opportunity for much ingenuity in finding the best tool for each job or, in the event of lack of such tool on the market, in making something to fit the need.

Selling Transportation Has Become a Necessity

THE developments of the past few years and, more acutely, some recent situations with which we are all more or less familiar, show that electric railway management does not consist only of the ability to operate a road economically. The days of development and design and the days of perplexing operating problems have both presented their special difficulties, but they have been, on the whole, fairly well mastered, or at least realized. But the outstanding problem for electric railway management today is to sell the transportation service which the railway furnishes or is in a position to furnish.

As we see it, there are four parts or phases of the business which must be sold in order that the whole transportation service be put across fairly and adequately.

First of all, we must sell the necessity of railway service as compared with any and all other forms of transportation. To do this we must prove, among other things, that jitneys alone will not answer the needs of a progressive community, but that unless jitneys are put on the same basis as regards schedules, taxes and other burdens and regulations they will drive the cars from the streets.

In the second place, we must thoroughly establish in the minds of all the good faith of the management and its desire to please the public so far as its ability to do so will permit.

In the third place, we must sell the monopoly idea—the economy and sufficiency of public utility service under one management.

Finally, we must sell the necessity for increased fares and rates, under present-day conditions.

All this is no small job. And it must be done thoroughly. And the sale must be made to two classes of people: First, the employees of the company, the men who perform the many acts connected with the actual operation, and, second, the public which uses the transportation service which the railways sell.

This is the big problem of today. It does no good to bemoan past failures, to condone past mistakes, to repeat past history. The job today is to sell transportation, and all energy should be put to do that job.

Too frequently we have seen what we interpret to be a lack of appreciation of the necessary psychological link between the management and its public—a little tendency to stand aloof, perhaps, or to neglect that closeness of personal touch which makes the difference between understanding and lack of understanding. We believe such acts are entirely thoughtless or the result of its being "the same old story," to talk to the public. But it's always a new public—new men and women or boys and girls become men and women. Perhaps there is an unconscious touch of the deplored policy of bygone days, represented by the alleged statement of the late William K. Vanderbilt, when railway men too often acted on the theory that they had the only real transportation agency and the public had to take it or do without. It may have been true, but the position was wrong psychologically.

That an act is unconscious makes it none the less harmful, and the result is felt not by any particular company but by the industry as a whole. It is a common duty for all of us to "sell transportation."

How can we accomplish what we want? That "actions speak louder than words" is as true today as ever in dealing with the public. This public is reasonable. Most Americans want to give a square deal, and they will, when shown. But they must be shown, and not only by argument but by example. Electric railway managers are susceptible to getting out of touch with the public, and a big part of the job is to guard against this.

Know your customer, make him respect you and like to do business with you. Acquaint him with your business and he is three-fourths won.

There Are Teams Now at Work

WE SAID something in our issue of July 10 about "The Coaches Can't Do It All" and we have been impressed by two or three examples since then which go to prove the point we made. We have already mentioned the fact that one element of electric railway management today is to "sell" the railway industry to the men on the job as well as to the public. The results of such work come back to us in gratifying manner.

A most inspiring instance of this truth, which occurred last week, was the waiver of the Quaker City carmen of their right to insist upon the wage increase due them until the company can afford to grant it. "For nine and a half years the management has played fair with us and it was about time that we came back at them," as one P. R. T. employee said. Another similar incident, though not quite so dramatic, was the support which employees' representatives have given the New York Railways in their recent troubles and arguments with Mayor Hylan. And another instance is the concerted action of the employees of the Connecticut Company in the various cities in which the jitney fight now rages. One of their representatives said in a recent town meeting, gathered to discuss the railway-bus competition, that for twenty or thirty years he and his fellows had been treated well, had had fair play by the management, and so were with the management now in this time of trouble. In both New York and Connecticut employees' petitions were presented which indicated not only a selfish interest of the men but also a conception of some of the real problems of the systems involved.

We repeat that "The Coaches Can't Do It All" and that it pays to have the men on the system intimately acquainted with the problems of the business—entirely "sold" on the needs of the industry.

Power Factor and Load Factor Important on Energy Contracts

WHAT load factor and power factor do you maintain upon your system? How much do they cost you per year? What limitations do they place upon your operation?

It is needless to emphasize again the losses in capacity of equipment, efficiency, regulation and net income resulting from operation at low power factor and load factor upon the system for which electrical energy is generated by the railway company itself. However, with the increased tendency to purchase energy for railway operation, or at least to allocate cost of energy between the railway and lighting departments of combined utilities, the problems of load factor and power factor are confronted in slightly different form.

The tendency of large central stations to penalize such low factors or to offer a bonus for the maintenance of high factors is increasing. Whatever may be the arguments against such a practice, they are principally applicable to the small consumer, who has difficulty in understanding both the meaning of the terms and the justification of the claims.

In the wholesale contract it should be relatively easy to reap a considerable saving as a result of a bonus for load factors 40 per cent and above and power factors between 85 and 100 per cent. In no case is it easier to maintain high power factor than in the average railway substation, equipped with synchronous converters or motor-generator sets. In the case of load factor the problem of obtaining sufficient diversity of load is rather more difficult. However, in large city systems, combined urban and interurban utilities and electrified steam railroads with regenerative braking relatively high load factors should be available. Recent reports from the Chicago, Milwaukee & St. Paul Railroad indicate that load factors have been increased from 40 to 60 per cent. This is an excellent showing for such a system.

A portion of the saving, particularly in the case of power factor, might well be passed along to the substation operator who is active in maintaining such a condition. It should not be necessary to install an elaborate metering system upon which to base such a plan. Regular reading of the substation power-factor meter, checked occasionally by an inspector, should be sufficient to determine the average value for the month. Even if a recording instrument seemed desirable for each substation the saving would probably be much greater and the expense involved in recording considerably less, respectively, than in the case of coasting clocks and energy measurements made at present upon individual cars as a basis for a bonus system for motormen.

It is possible that in our attempt to run down and eliminate every possible operating and maintenance cost, in these days of conservation, we have neglected this very important saving. As a result of a recent investigation made by H. C. Thuerck of Purdue University 88 per cent of the central stations questioned were found to include load factor clauses in their contracts and 50 per cent include clauses involving power factor. As these central stations represent the largest utilities of the country the practical possibility of closing contracts in the future involving such clauses is very evident.

A typical clause, involving both load factor and power factor, taken from the wholesale contract form of one of the large central stations reads as follows:

> The maximum demand shall be determined from actual measurements of the customer's demand and a consideration of the power factor at which these measurements are taken and shall be calculated by multiplying the greatest integrated fifteen-minute demand occurring at any time within the twelve months ending with the month under consideration (eliminating from consideration, however, peaks or demands due to short circuits, line disturbances, etc.) by 80 per cent divided by the actual power factor at which the measurement is taken.

The average annual load factor of the central stations reporting was 52 per cent, with a range of from 32.5 to 92.2 per cent. The monthly load factors vary from 40 to 92.8 per cent, with an average of 61 per cent. Power factors were found to cover the entire field from 70 to 100 per cent, with an average of 90 per cent.

It does not follow, of course, that the addition of a relatively low load-factor load of a railway system will lower the load factor of the central station. In fact, it is very likely to raise it, due to the diversity of the two peak loads. As increased load factors and power factors mean increased economy and greater conservation of fuel such problems are worthy of extensive detailed study.

Interlocked Planning of Transportation System and Town

A VERY desirable new residential suburb of Cleveland was recently made more desirable by the placing in operation of a new rapid transit railway which makes it possible for the suburbanite to go from his home to the Public Square in less than thirty minutes despite a distance intervening of 9 miles. This new railway is described on another page of this issue. The interesting part about this is that the planning of the railway was interlocked with the planning of the suburb. Transportation was just one phase of a very comprehensive plan worked out by a firm of real estate operators for opening up a great tract of land outside of Cleveland for residential properties.

These men have demonstrated a pretty good knowledge of transportation matters as well as real estate. They realized that high speed transportation connecting their property with the heart of the city would be a tremendous advantage in disposing of the land at a profit. They made the high speed service possible by securing a private right-of-way from their property all the way to the Public Square and built a road without any grade crossings except those in the suburb itself. Then they accomplished what in effect is an excellent skip-stop system in the suburb by so laying out the streets that there are only three through street crossings with the railway per mile and hence only three stops per mile. This secures the economy of few stops and makes possible a high schedule speed—the advantages of skip-stop operation—without introducing any of the criticism of the skip-stop plan, for if the street on which a man lives does not run through to the car line he is not going to kick because the car doesn't stop at his corner.

Furthermore, by limiting the number of stops and thereby multiplying the number of riders to board and leave the cars at each stop there will develop there a business center, resulting in a great enhancement of land values. This joint real estate and railway development in Cleveland will be at least one case, apparently, where the builders of the railway will derive some benefit from the great appreciation of property values that always follows good transportation.



DOUBLE BOULEVARD AND DEPRESSED RAILWAY CONSTRUCTION THROUGH EAST END OF SHAKER HEIGHTS

New Rapid Transit Line in Cleveland

Line Built as Part of Real Estate Development, with Entrance to Public Square Over Private Right-of-Way, Has Become Main Factor in New Union Station Project— Temporary Entrance Over Surface Line Tracks Begun with 20 m.p.h. Schedule Speed Average for Run

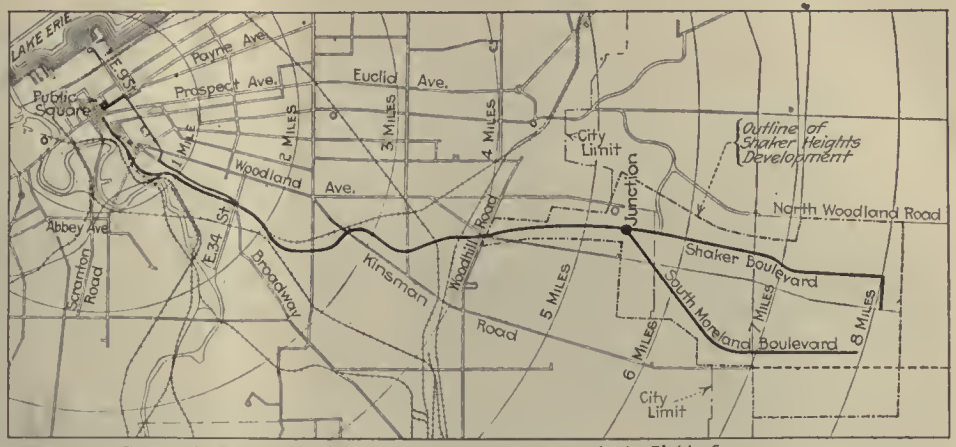
SEVERAL years ago the Van Sweringen Company, Cleveland, Ohio, platted a 4,000-acre tract of land just outside the city limits and to the southwest of Cleveland and opened it up for home sites under the name of Shaker Heights. Since that time nearly 8,000 properties, ranging in size from 40-ft. lots to two- and three-acre pieces, have been sold and numerous families have taken up residence in this incorporated suburb.

As the new suburb was more than 8 miles from the Public Square and practically without transportation facilities, a part of the comprehensive plan of the Van Sweringen interests was to provide a high-speed electric railway service over private right-of-way from the suburb to the Public Square at the heart of Cleveland. This, it was planned, would give the residents of this section a means of getting to their work in the city in much less time than they could when living in the more desirable residential sections within the city limits, where they would depend on the street railway. This promise of a rapid transit system provided a forceful selling argument in interesting prospective buyers in Shaker Heights real estate. This was all done in good faith, and the railway right-of-way laid out and provided for in the immense program of street improvements and other development work which the real estate company carried on, involving the investment of large sums of money. But while the first contracts for work on the rapid transit line were let in 1914, the war-time restrictions, high prices and scarcity of materials have delayed the completion of the railway until recently. Operation was finally begun on Sunday, April 11, 1920.

For the purpose of building the rapid transit line the Cleveland Interurban Railway Company was organized as a subsidiary of the Van Sweringen Company. The location of the private right-of-way of this railway from the Public Square to Shaker Heights, the present route from the Public Square to Thirty-fourth Street over lines of the Cleveland Railway, and the location of Shaker Heights relative to the city of Cleveland are shown in an accompanying map. The private right-of-way of the company, which has already been secured, begins practically at the Public Square and extends out through the valley of the Cuyahoga River, adjacent to the Nickel Plate Railroad, and thence through a cut without grade crossings practically to the junction point in Shaker Heights. From here out the line divides into two branches, both built on the surface, one extending 2⅞ miles beyond the junction over the South Moreland Boulevard and the other 2⅝ miles over the Shaker Boulevard. The distance from the Public Square to the junction is 6⅛ miles, making the total distance to the end of the South Moreland branch 9 miles and to the end of the Shaker Boulevard branch 8¾ miles, a total length of double-track line of 11⅝ miles and an equivalent single-track mileage of 23¼ miles.

Because the right-of-way in the central section of the city made possible connection with practically every railroad entering Cleveland easy, the Cleveland Interurban Railway rather naturally became involved in the Union Station project as affording the best entrance into a new station for all steam and electric lines, having a location close to the Public Square. The complications of this larger undertaking have delayed the completion of the plant of the interurban company for its own entrance to the Public Square, and temporarily

the rapid transit cars are therefore being routed from Thirty-fourth Street in over existing lines of the Cleveland Railway, a distance of 1⅞ miles. The routing of the rapid transit cars at present is therefore around the post office loop adjacent to the Public Square, thence north on Superior to East Ninth Street, west on Ninth Street to Broadway and along Broadway to Thirty-fourth Street, there joining the private right-of-way.



OUTLINE MAP OF SECTION OF CLEVELAND, SHOWING LOCATION OF SHAKER HEIGHTS DEVELOPMENT AND THE ROUTE OF THE NEW CLEVELAND INTERURBAN RAILWAY

The right-of-way is laid out the entire length and all bridges designed for an ultimate of four tracks, looking toward an express and local service at some future time. At present the system has been double-tracked throughout. As soon as the right-of-way enters the Van Sweringen property it widens out to provide a 90-ft. railway area through the center, with a 50-ft. boulevard on either side. There are no grade crossings between the downtown terminal and the junction point in Shaker Heights. From Woodhill Road to the junction the tracks are depressed and a brick and concrete fence, unique in design, ornamental and comparatively inexpensive, has been built for protection along either side of the depression. The details of this fence design are taken up in a later paragraph. The boulevard lighting poles are built into this fence, and it is the plan to carry the feed wires for the lighting system on the trolley poles with a lead-in from each lamp, thus avoiding any wires paralleling the boulevard other than those on the trolley poles. The frontage along the boulevards is to be developed with high-grade apartment buildings.

One of the unique features developed in connection with the operation of the cars on the surface from the junction point to the ends of the two lines is that the layout of streets was so arranged that there would be a grade crossing only every one-third mile. This serves the dual purpose of minimizing the danger of accidents at grade crossings and reducing the number of stops to a maximum of three per mile. This feature was carried out completely in connection with the South Moreland Boulevard branch, but it was not thought of until the street construction work along Shaker Boulevard, which was done first, was too far along to change. This control over the number of stops through the street arrangement is better appreciated by a glance at the accompanying map of Shaker Heights.

A further result of the limitation of the number of stops to three per mile through the layout of street intersections will be to make each of these points a business or community center. As a part of the development of this idea the promoters plan to build a railway station at each of these points and so to design it as to provide for important concessions from which an income will be derived. This return, it is expected, will considerably more than offset the interest on the investment and the maintenance of the property. Each of these stations is to be of different architectural design, providing a distinctly ornamental addition to the business center that will harmonize with the surroundings and meet business needs. None of these stations has as yet been built, but the plans for them are pretty well along and several of them will be built this summer, according to present plans.

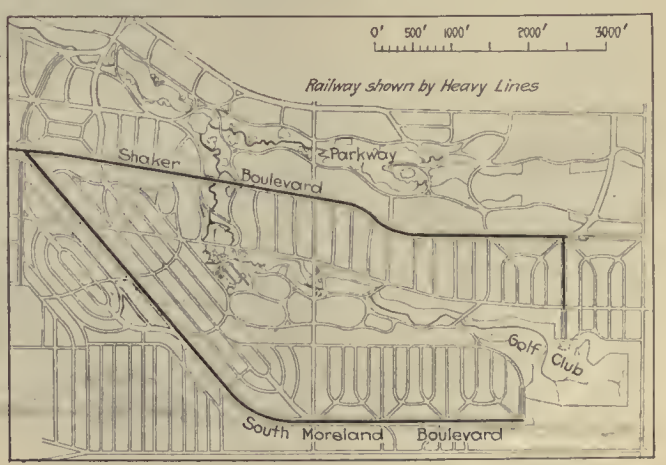
Track and Overhead Construction

The track and overhead are of high-grade construction, following along standard practices. The track is all of open type construction, with 90-lb. A. S. C. E. rail laid on 8½-ft. x 7-in. x 9-in. oak and yellow pine ties, some creosoted and some not, depending on what could be secured. The roadbed is completely rock ballasted. Bonzana continuous joints and Abbott joint plates and welded bonds of the type developed by L. P. Crecelius, electrical engineer Cleveland Railway, were used.

The overhead is of the catenary type, supported on concrete center poles. The trolley used was of No. 0000 size and about 4 miles of 500,000 circ.mil feeder is carried on short side-arm brackets on the trolley poles.

Rolling Stock for the Rapid Transit Line

For the time being, four of the Cleveland Railway center-entrance and exit cars, refitted for the rapid transit service, comprise the complete rolling stock equipment of the interurban railway company. These



MAP OF SHAKER HEIGHTS SHOWING LAYOUT OF STREETS TO LIMIT THE NUMBER OF STOPS TO THREE PER MILE



VIEW OF NEW LINE AT JUNCTION POINT WHERE SURFACE CONSTRUCTION BEGINS, SHOWING CENTER POLE AND CATENARY OVERHEAD CONSTRUCTION



TYPICAL BRIDGE CONSTRUCTION, SHOWING PROVISION FOR AN ULTIMATE OF FOUR TRACKS, AND TEMPORARY STAIRS DOWN TO THE LOADING POINT

will be added to as the territory served develops. These car bodies are owned and supplied by the Cleveland Railway under an operating agreement, which will be given in a later paragraph, but the cost of re-equipping them was paid by the interurban company. The equipment comprises Brill 68-E-1 trucks mounted on 26-in. wheels and having a 6-ft. wheelbase, four Westinghouse 340-A-1 motors geared for 45 m.p.h., Westinghouse HL multiple-unit control and automatic air brakes. The car bodies are 51 ft. long and have longitudinal seats on one side and cross-seats on the other, with a well in the center, and provide a seating capacity of sixty passengers. The cab partition at the front end of the cars was moved back slightly to make room for the installation of the multiple-unit control equipment in the cab. The installation of this equipment in the cab was made partly because of lack of clearance and space underneath the car and partly to make frequent inspection, cleaning and any repair work easy. The manner in which the control mechanism was mounted in an asbestos lined cabinet in the motorman's cab is pictured in an accompanying illustration.

A thirty-minute service is being given on both the South Moreland and Shaker Boulevard branches, the cars on both lines being operated into the city, thus providing a fifteen-minute service between the Public Square and the junction point. As the riding increases with the growth of the territory additional cars will be added to each train rather than to shorten the headway. This manner of increasing the service will be carried out in order to preserve certain definite times of arrival and departure of cars, since it is believed there will be less objection to comparatively infrequent service if the riders know what the schedule is.

The running time from the end of either branch to the Public Square is at present twenty-seven minutes, permitting of a three-minute layover at either end of the run, each car making one round trip an hour. The schedule speed obtained in this service is at 20 m.p.h., including stops. When the union terminal project is completed, so that the cars can be operated the entire distance over private right-of-way, it will be possible to cut seven minutes off the running time each way. This will give a schedule speed, including stops, of 27 m.p.h., and make it possible for residents at the end of the lines in Shaker Heights to ride to the Public







AT TOP, TYPE OF CAR BEING USED IN THE RAPID TRANSIT SERVICE. AT LEFT, CONSTRUCTION ON PRIVATE RIGHT-OF-WAY OF CLEVELAND INTERURBAN RAILWAY IN CLEVELAND. AT RIGHT, DEPRESSED RIGHT-OF-WAY BETWEEN WOODHILL ROAD AND THE JUNCTION, SHOWING ORNAMENTAL FENCE ALONG EITHER SIDE

Square in twenty minutes. A flat fare of 10 cents for a ride over the full length of the line, or any part of it, will be collected when operated completely over the company's own right-of-way begins. At present the 5-cent fare is collected when the passenger boards the car and another when the car passes from the city line to the interurban line or vice versa. An effort was made to work out a zone plan in this connection, but the difficulties of locating zoning points and features of competition with the Cleveland Railway city lines brought the conclusion that this was not expedient. The 10-cent flat fare, however, even from points within the city limits to the Public Square, has not seemed to deter people from riding on the rapid transit line, though they could ride over the lines of the Cleveland Railway from the same point for 5 cents. For example, officials of the interurban railway have been surprised at the amount of business originating at the Woodhill Road stop. This is in a community settled largely by workingmen and served by a city line. However, the running time to the Public Square on the latter is twenty-five minutes, whereas it is only fourteen minutes on the rapid transit line. This difference of running time has apparently attracted the patronage of numbers of working people despite the 10-cent fare.

It has been found, since the operation of the rapid transit line began, that the travel of domestic employees and mechanics between the city and Shaker Heights gives about equally heavy traffic both ways during the rush hours. This characteristic will undoubtedly change as the territory becomes more thickly settled and the number of building operations decreases, although there will very likely continue to be a noticeable traffic of domestic help outbound in the morning and inbound in the evening.

Operating Agreement with Cleveland Railway

The Cleveland Railway entered into an operating agreement with the Cleveland Interurban Railway last September. By the terms of this contract the former furnishes the rolling stock (temporarily) and the trainmen and power necessary for the service and maintains the overhead equipment and all fixtures, collects and retains all fares and pays the cost of operation, including maintenance, transportation expenses, general expenses, taxes and interest. The units to be used in figuring these costs are the average costs per car-mile of operating the city lines. If there is any surplus over these costs the city company pays the interurban company 90 per cent thereof, but the latter indemnifies the former against any deficit. The city company is entitled to collect and retain the regular rate of fare from passengers on the rapid transit cars while they are on the city track between the Public Square and East Thirty-fourth Street, in addition to the fares collected from passengers while on the interurban company's track. In return for the revenue thus obtained from passengers while on the city track the city company pays the interurban company 2 cents per car-mile for the use of its cars.



MULTIPLE-UNIT CONTROL EQUIPMENT MOUNTED IN THE CAB OF THE RAPID TRANSIT CARS

The agreement was made for a period of two years from Oct. 1, 1919, and for another year beyond that expiration if neither party desires to terminate it upon its expiration.

The fence, previously referred to, along the depressed right-of-way was constructed by first pouring a 24-in. square footing 3 ft. deep and coming up to the level of the ground every 15 ft. Four ½-in. steel rods, 24 in.



CONCRETE CRIBBING USED IN SHORING UP THE SIDES OF CUTS

long, were then set in this concrete, with 12 in. projecting above the top. Pre-cast heavily reinforced 7-in. x 6-in. concrete bottom rails were then laid to span these footings, being placed between the vertical rods set in the footings.

With the bottom rails in place, a single tier of brick was laid on the footing and carried up to the proper height, forming a hollow post 17 in. square on the outside. The posts were then filled in with concrete, the 13-in. wide heavily reinforced concrete top rails laid in place and the posts topped off, filled in with concrete and capped, giving a solid monolithic construction. The space between the bottom and top concrete rails was then filled in with a 4-in. curtain wall of brick. This brick curtain serves only to complete the appearance of the fence, the posts and top and bottom rails providing all the strength necessary. This has been attested by the manner in which the fence has withstood the shock of a severe bump from an automobile on two or three occasions. The curtain wall has been knocked out, but the concrete rails have not been damaged, though the automobiles have.

The property of the Cleveland Interurban Railway was planned very largely by W. E. Pease, chief engineer the Van Sweringen Company.

New Discipline Plan in Los Angeles

Merit and Demerit System with Novel Features Adopted by Los Angeles Railway Corporation for Its System

A MERIT and discipline system that makes employees disciples of merit is the program of cooperation between executives and platform men that has been introduced by the Los Angeles Railway Corporation. On the theory that a man's past record should not prevent him turning over a new leaf for efficient service, the company has discarded all previous conduct sheets. A new card index has been opened for veteran and new employees alike.

Commencing with a mark of 100 per cent each month, a motorman or conductor has the opportunity to maintain his clear record for thirty days and earn the cash bonus which is attached to the pay envelope or he may automatically discharge himself by accumulation of demerits which would bring his efficiency below a mark of 75 per cent. While a man may earn the bonus by keeping his commencement record of 100 per cent clear, he can place himself in line for special consideration and promotion by gaining credits that would give him more than 100 per cent.

G. J. Kuhrts, general manager of the company, placed this new system into effect, and under the "Kuhrts Plan," as this system has become known, supervisors have the first authority to impose credits or demerits. Since they are the closest to the platform men during working hours they are in position to observe when an employee is exerting his best efforts to render accurate daily reports, display exceptional acts in prevention of accidents or injury and like matters. At the same time the supervisor is the first to observe when an employee shows a laxity in observance of running schedules, careless operations of car, failure, neglect in collection of all fares and rendering of prompt and proper reports.

The supervisor's observations are reported to the division superintendent and the latter assumes jurisdiction when the supervisor finds himself unable to handle the situation and virtually confesses failure. If a case of alleged negligence in duty is so complex that the division superintendent is unable to handle it, then it goes to the manager of service, George Baker Anderson. The latter represents the "Court of Last Resort," and he reviews all credits and demerits. An employee is welcome to appeal his case to the manager of service after a supervisor or superintendent has meted out discipline and he is assured of a hearing. At the end of the month each platform man receives a card showing his efficiency percentage for the month, then the slate is wiped clean for the next month.

The "Kuhrts Plan" is designed to increase the initiative of platform men as contrasted with the discarded system of expecting men to follow orders and ask no questions. Practical suggestions for the betterment of service are recognized under the merit system and encouraged by an award of from five to fifteen points credits.

Placing opportunity in the hands of the men instead of merely expecting them to fulfill routine instructions is the keynote of this plan. A quick response has come from them. Since the plan has been in effect increased efficiency as well as the increased care of materials has been noticeable.

When a man's percentage of efficiency falls to less than 75 and he stands at the threshold of dismissal his general attitude to the company is carefully weighed before final action is taken. The "Kuhrts Plan" is to help the man who will try. If in the face of his opportunities he shows general disregard for his own welfare as well as that of the company and his offences are serious he automatically discharges himself in short order. But the final word dismissing a man cannot be given until approval has been given by the manager of service.

The grading of credits or demerits is on the basis of from five to fifty points each, with five points representing 1 per cent. The credit accounts are balanced monthly and the bonus will come in the form of a Christmas gift. Payment will be made Dec. 15, but a man must have been in the company's service six months to be eligible. This feature encourages men to stay with the job and take a lively interest in their work, knowing that financial reward and appreciation are forthcoming.

A Unique Service

IN a recent issue of *System* the following suggestion for increasing the volume of business of drug stores and other busy corner stores is offered. This appears to be a suggestion upon which the electric railway may many times capitalize.

The note says: Street car callers, similar to the train callers in railroad stations, are used successfully by the management of a drug store in Springfield, Ohio, as a service to the public. The store is situated on a street corner where the majority of car passengers transfer from one line to another.

For the benefit of the public, the arrival of cars on the different lines is announced by a caller in the drug store. A customer does not have to worry about missing a car, but can make any necessary purchases while waiting in the store.

That this and other service plans inaugurated by the store are successful in winning customers is attested by the heavy increase in the volume of business.

The Place of the Bus—VI

In This Final Article It Is Shown that Practically Every Kind of Motor Bus Operation Costs More Than Modern Car Service on a Well-Traveled Route, Proving that at Present Costs the Bus May Supplement but Cannot, from an Economical Point of View, Supplant the Electric Railway Upon the Basis of Equal Fare and Responsibilities

BY WALTER JACKSON
Consulting Engineer



FIFTH AVENUE, NEW YORK, LOOKING NORTH FROM FORTIETH STREET. THERE IS AMPLE ROOM FOR THREE LINES OF VEHICLES IN EACH DIRECTION

"THE world is so full of a number of things," sang Stevenson—fancy flights about motor bus profits included, we would add. Between the well-meant enthusiasm of the motor bus salesman, the exuberance of the traction-fighting city official and the entrancing "within-the-law" prospectuses of the stock broker the inquirer finds it difficult to hit the straight trail to the altar of Truth unless he is prepared to seek the facts at the source. In the cases of individual bus operation, hereinafter presented, the data were obtained through personal interviews with scores of busmen and bus dealers and their statements were then checked and counterchecked to allow for the usual percentage of prevarication. In the cases of companies recourse was also taken to inquiry of the management, to the study of private records and court proceedings and to analysis of public, but not always easily accessible, reports. As much material was obtained in confidence the writer will be sparing in the use of names but liberal in the description of conditions that affect business and costs.

The figures have been prepared to cover the entire range of motor bus operation from the Ford one-man bus to the *de luxe* double-deckers, inasmuch as the success or failure of motor bus service depends so largely upon choosing the right capacity. A short-haul seventeen-seater will have a better schedule and make more money than a thirty-seater if the latter has to run during many thin hours, and there are cases where a 5-cent vehicle makes money where a 10-cent bus would lose it. Most of the data given were obtained in studies for various clients during the latter part of 1919 and the first three months of 1920. The cost of gasoline is one important item that has gone up, 6 cents or more to the gallon since most of these data were secured, and as the general trend is upward it will be proper enough to assume that the figures are low rather than high.

SIXTEEN HOURS A DAY MAKE A JITNEY PAY

Table I shows some of the high spots in the operation of a seven-seater in a thriving New England city. The route is exceptionally fine because there are factories at each end, the business and amusement center is half way between and a mingling of residences with factories assures well-balanced two-way travel almost every hour of the day. The operator was a South American who lived sparingly, ran his car up to sixteen hours a day, was polite to his customers in broken English and saved $10 a day on the average for the threefold purpose of maintaining his car, paying for his bread and garlic and purchasing a $2,100 Reo speed wagon, out of which he hoped to make a daily profit of $15 to $20 with fewer working hours for himself. By dint of hard work he had accumulated enough to pay the customary $800 down and $100 a month thereafter with interest at 6 per cent. His reason for turning to the sixteen-passenger bus was that the $250 a year liability premium was too heavy a burden for a seven-seater, aside from the long hours of labor.

TABLE I—SEVEN-SEAT HIGH-GRADE TOURING CAR IN A NEW ENGLAND CITY

Length of run	3.7 miles
Schedule speed	16 m.p.h.
Daily fair weather earnings	$15–$17
Daily bad weather earnings	$12
Saturday maximum earnings	$20
Operates from 6:30 a.m. until late at night	
Daily gasoline cost	$2
Daily upkeep, lubrication, repairs	$2
Tire life	3 months
Annual license fees and markers	$20
Liability bond per annum cost	$250
Estimated daily profit, out of which depreciation, tires, wages and bonding would have to come	$10

TABLE II—FORD CHASSIS UNDER NINE-SEAT BUS IN A NEW ENGLAND CITY

Length of run	3.7 or 3.13 miles
Schedule speed	12 m.p.h.
Daily fair weather earnings	$15
Daily bad weather earnings	$10
Saturday maximum earnings	$18
Operates from 6:30 a.m. to 10 a.m. 11:30 a.m. to 2 or 3 p.m. 4 p.m. to 7:30 p.m.	
Daily gasoline, oil and tires	$5
Repairs	Self-made
Annual license fees and markers	$20
Liability bond per annum cost	$250
Miles per gallon gasoline	8

TABLE III—ONE-TON USED STEWART TWELVE-SEAT BUS IN NEW ENGLAND SUBURBAN SERVICE

Length of run (suburban)	6 miles and mor
Express running time	35 minutes
Normal or local running time	45 minutes
Average fair weather intake daily	$25
Fares—10 cents and 15 cents; some children at 5 cents	
Operates weekdays from 5:40 a.m. to 7:30 and 8 p.m.	
Operates Sundays from 1:30 p.m. to 7:00 p.m.	
Daily gasoline 12 gal. at 26 cents per gallon	
Miles per gallon gasoline	8¼
Daily lubricant for 100 miles run	2 qt., 1 pt.
Daily gasoline, oil and tire charge	$7
Daily cost of 35x5 in. tires (bad roads)	$3
Annual bond, license, tax, etc.	$470
Annual fire and collision insurance *	$100

* This is a very rare charge among jitney bus men.

TABLE IV—ONE-TON STUDEBAKER INSTALLATION (THREE BUSES) IN NEW ENGLAND SUBURBAN SERVICE

Length of run, city and suburban, all smooth paving	14 miles
Running time of 45 minutes equivalent to schedule of	19 m.p.h.
Average daily earnings	$30
Fare practically 2 cents per mile, or for 14 miles	25 cents
Minimum intertown fare	10 cents
Hours of service in combination with others	4:45 a.m.-12:50 a.m.
Daily gasoline, oil, tires and upkeep	$11
Weekly wages of drivers, nine-hour day	$25 to $30
Owner's estimate of total operating expenses per mile	25 cents
Annual bond, tax, license charges per bus (exclusive of liability bond)	$39

Table II tells the story of another satisfied operator. Until the passage of a "one-route-within-twenty-four-hour" ordinance, he had the pleasant habit of dividing his time on two routes according to the flow of traffic. On the 3.7-mile route already named he would operate from 6 a.m. to 10 a.m., lay off until 11:30, then work up to 2 or 3 p.m. on a 3.13-mile route which enjoys exceptionally good midday shopping and theater travel. After a rest to 4 p.m. he returned to the first route to carry factory workers up to 7.30 p.m. This man was an intelligent American mechanic who had studied traffic possibilities to a nicety. He was satisfied that he could bring his gross earnings up from $20 to $22 a day, but did not relish the extra hours this would involve. As he operated only through the best hours of the day and drove his car so carefully he did not believe it would pay him to employ a driver with so small a bus for the sake of an eighteen-hour day. While he was not sure whether he could call his vehicle a nine-seater or an eleven-seater, he pointed with pride to the fact that he had carried as many as thirty-three (highly compressible) girls. His Ford bus had cost him $1,150, on the basis of $415 down and $100 a month thereafter with interest at 6 per cent. At the time these figures were obtained (January, 1920) the price would have been $1,215. The bus was not large enough for the business, so he was going to pass it on to his brother in favor of a sixteen-passenger Reo, for which he would pay $2,300 instead of $2,150 (for the sake of having oversized tires), making a first payment of $500 cash and $300 value of second-hand equipment. He had but one complaint: That the trolley cars on one-third of the run were so thick they interfered with his schedule!

Non-Stop Service Gives Bus the Jump in Suburban Service

Table III tells some of the story of another bus operator in the same territory. In this instance operation is to a suburb and not all of the road is smooth going. By dint of hard work and many little courtesies to patrons this driver has worked up quite a personal clientèle—a condition not uncommon on suburban long-headway routes. Knowing almost to a person where his customers are to be expected, this operator does not bother to stop for riders within the city 5-cent jitney zone, but does pick up the children of his suburban customers at 5 cents on their way to or from school when he is likely to have room for them. His running time does not represent the best that could be done with a bus. A new machine would make the same run in about ten minutes less, he said. There is not much to choose between the speed and the service of car and bus in this example, but the busmen on this route have worked out to a high degree of refinement the art of starting a minute or two before the car and thus picking up most of the waiting customers. During the rush hours, namely, 6 a.m. to 9 a.m. and 4 p.m. to 6 p.m., they have a more legitimate advantage over the trolley service in giving non-stop operation between suburb and city. If there were no trolley line, of course, there would have to be a local bus service too. In any event, the rush-hour bus, unlike the car, runs more miles instead of less during the heaviest hours. In co-ordination with the trolley service, such through bus operation would be entitled to and would get a fare higher than that charged for the local car service. In competition with the trolley, however, this is economic waste which the public must pay for in the end.

Hard Sledding for the Highway Trolley

Table IV tells the tale of another bus route in competition with the trolley, as studied in the same territory. It is one of the rare instances where the buses are driven by employees. The owner has three machines of similar type, one of which is usually in the repair shop or in reserve. He is an expert mechanic and proud of the fact that he has obtained, in four years or more, some 250,000 miles from a 1-ton delivery type. This man had kept close tabs on his accounts. He held the opinion that his operating expenses alone amounted to 25 cents per bus-mile, or between 1.5 and 1.75 cents per seat-mile. When his other charges, such as replacement, license, bonds and taxes, are taken into consideration his margin is a very narrow one indeed. One may doubt whether his personal earnings per hour of work are any higher than if he were engaged as an expert mechanic for an employer.

However, looking at this from the selfish viewpoint

of the rider, let us make a contrast with the trolley service as follows:

The headways offered by this operator and his fellow-jitney operators are the same as those of the trolley company, namely, fifteen to forty minutes. The running time of the bus, however, averages forty-five minutes, which is some twenty minutes faster than the trolley. The latter is handicapped by the usual delays in city and village streets, in addition to which it lacks enough sidings to permit better headways of the overlapping routes than, say, ten minutes. An increase in the number of sidings and the use of light, one-man cars would probably wipe out the present kind of bus operation almost instantaneously, for even now the busman's margin is perilously small. With a 25 to 50 per cent increase in trolley mileage it would not be possible for the busmen to pursue their present trick of starting out just a minute or two ahead of the car to snap up roadway patrons. In this case such policy is particularly harmful to the trolley, because during its layover within a block from the town center on a public street the bus attracts people who have completed their business ten, fifteen or twenty minutes before the departure of the next bus or car. It is more natural that they should enter and make themselves at home in the layover bus than stand on a street corner until a car for the same destination goes by.

TABLE V—AVERAGE COST OF OPERATING SIXTEEN-SEAT JITNEY BUS IN A NEW ENGLAND CITY WHERE EARNINGS ARE HIGH

Earnings at $25 to $30 a day (850 miles a week)	$0 20	per mile
Or, say	$170	per week
Costs per week:		
Driver for nine-hour day	$35	
Gasoline and oil for eighteen-hour day	25	
Tires	10	
Incidentals	5	
Add:		
Owner's wages for nine-hour day	40	
For 33⅓% depreciation on $2,200 bus	14	
Interest on $2,200 at 6%	2.50	
$400 per annum for taxes, license, bond, or	7.75	
Repairs at 1 cent a mile	8.50	
Pay for garage, starters, etc	6 00	
Total weekly expenses	$151.75	

In round numbers, say $152 for 850 miles, or 18 cents per mile.

The bus also offers a lower fare than the trolley, the contrasting rates being 25 cents against 32 cents. Up to mid-October, 1919, the bus charged 20 cents. In all probability the busmen could charge more than the trolley rather than less and be better off. Their service is worth it. Indeed, the absence of the "selling transportation" spirit when the present trolley cars were bought is proved by the condition that the uncomfortable longitudinal seat should be standard for a 14-mile ride. A cross-seat bus of more liberal dimensions would simply run away with the business.

As the public is getting more service and better speed than ever before, it is hardly in the mood to listen to any additional taxation of the buses, such as a road-maintenance charge. On the other hand, here is the trolley line monopolizing one-fourth to one-third the width of a state highway with ever-increasing automotive traffic. The automobilist is already looking with longing eyes toward the unpaved strip used by the relatively occasional trolley car. A few years more and he will be clamoring loudly that the principle of the greatest good for the greatest number demands the paving of the right-of-way strip and the practical abolition of the trolley.

Looking at this matter then in a cold-blooded, practical way, it is up to the electric railway management to balance the cost of track improvement and modern one-man cars against the cost of substituting a modern one-man gas or trackless trolley bus service for an obsolescing trolley system. When the public understands just what the company can do in the way of fares and service under each method and what the relative charges or benefits will be to the community it will be possible to come to a satisfactory decision.

It is possible to conceive a solution whereby the trolley service in the closer populated districts will be retained for short hauls at low rates and a non-stop bus service at higher rates be operated between the terminal cities; but one cannot conceive a solution that would permit the continuation of two competing services each of which is below par.

Narrow Jitney Margins that Can Be Wiped Out By More Trolley Service

Table V presents the average actual cost of a sixteen-passenger jitney bus as determined from a study of a large number of buses in the same city. The earnings are exceptionally high, for this operation is in a city where about one-third the traffic is within 1.25 miles and more than three-fourths of the traffic within 2 miles, and on the principal routes of which the loads are beautifully balanced. Operation is for eighteen hours a day and includes some special hacking service.

It will be seen that the actual operating expenses plus overhead bring the cost of a sixteen-passenger vehicle to 18 cents a mile, leaving a margin of 2 cents a mile over and above the actual wages of the operator. In practice, however, the $900 which this table shows as the total for a fifty-week year would be curtailed by bad weather, laying up of the bus for overhauling, etc. But the obvious fact is that the margin between wages and operating profit is a mere 2 cents per mile, which would be wiped out at once by the introduction of 25 to 50 per cent more trolley service. It follows that, despite the exceptionally favorable jitney conditions in this particular city, the only true field for an automotive vehicle is to offer short-cut rides at somewhat higher rates than the trolley instead of competing over the same streets and at a lower rate of fare.

[No account is taken of the fact that increases in gasoline and other costs since the foregoing data were secured would add 1 to 2 cents per mile.]

It is interesting to compare this example from practice with a set-up of costs issued by a manufacturer of the same general line of buses. His total of gasoline, oil, tires, repairs, insurance, depreciation (four-year basis) interest and garage worked out roughly at 9 cents a mile, with gasoline at 26 cents a gallon (now more than 30 cents). Unfortunately, no allowance was made for license, tax, bonding, jitney association membership dues, etc., which we have seen equivalent to $400 per annum, nor is any allowance made for the $35 a week wages or $1,815 per year of approximately forty-nine weeks. This unavoidable addition of $2,215 per annum is equivalent to another 7.3 cents per bus-mile on the maker's fair assumption of 30,000 miles per annum with one driver only. Adding 9 cents and 7.3 cents gives us 16.3 cents, which is not so far away from the 18 cents found in practice. Having overlooked the wage, bond, tax and similar costs, the bus maker showed the delightful result of 22 cents per bus-mile gross and only 9 cents per bus-mile for expense. In reality, only the most intensive cultivation of traffic under still more favorable conditions than the instance cited would give

a gross earning as good as 20 cents per bus-mile, while the cost of operation and overhead necessarily advances with the age of the vehicle, aside from recent increases in gasoline and other supplies.

For all that, there will always be plenty of men to take a chance in an individual business even if nothing more than bare wages result. Knowing this, some bus manufacturers sell their machines on the basis of 20 per cent down and installments of $100 or so a month with interest at 6 per cent. They have nothing to lose, for if the first buyer does not make good they can resell the machine as a used car and still show a profit. Railway companies, therefore, should not lull themselves to blissful sleep because of repeated demonstrations that jitney bus operation is of doubtful profit to the jitneur. They must make it a point to give a character of service, both car and motor bus, that will kill the snake in the shell.

THE STORY OF A WELL-RUN JITNEY BUS COMPANY

Generally it is quite out of the question for a jitney bus company to operate as carefully and efficiently as the individual jitney operator. The writer, however, has studied the workings of one such concern whose methods in some respects are worth the earnest attention of electric railways which are contemplating motor bus operation. The high spots of its operation are shown in Table VI.

The company is now operating on half a dozen routes twenty to thirty motor buses, all with Day-Elder chassis with bodies fitted chiefly with railway type rattan cross-seats, to give a capacity of twenty-three. The interior is roomy and much better lighted than the usual jitney bus. Attention has also been given in the arrangement of door, step and seating to make ingress and egress comfortable, safe and rapid. The vehicles are attractive and are kept in excellent condition. The downtown starter acts also as an inspector to correct minor troubles and forestall major ones.

Employees are not uniformed, but appear to be courteous and skillful. Their wage is below that of the local street railway, but actually a good driver earns more, as he receives 5 per cent of all gross earnings shown by his farebox as a bonus. This appears to be a real stimulus to the men to go after business. The company is also planning to pay $100 to each man who completes a year's service without accident. There is considerable democracy of management, the men themselves deciding upon the rotation of their runs, which they seem to prefer upon the basis of alternating "earlies" and "lates." As there are two shifts to a bus, every vehicle is kept out for eighteen hours a day. This arrangement permits the bus company to rent out its garage facilities, located near the business center, for storage and inspection of private machines. Hence it may be said that garage expense is practically nil.

Competition with the electric railway is direct, inasmuch as the buses run over the same routes and at fares of 5 and 10 cents against 6 and 12 cents. On one of the best-traveled routes the over-all bus ride is only 2.5 miles. The bus has no noticeable advantage in local frequent-stop operation, but during rush hours it makes through runs between terminals at a great saving in time over the electric cars, which cannot do any leap-frogging. Pneumatic tires are used as being more pleasing to the rider. On this point it may be worth remarking that habitual jitney riders invariably prefer the pneumatic-tired vehicle, although a solid-tired vehicle may be ahead in the line-up. For that reason, operators who begin with solid tires go to pneumatics eventually.

This bus company has the advantage of operating in a highly industrialized section with an unusually good load factor, although not the equal of the city previously described. Up to the present time its gross earnings have been high enough to show an apparent profit over the operating and fixed expenses, which must be on the order of at least 25 cents per mile, judging from the company's own estimates and the estimates of the chassis builder. It must not be forgotten that a large proportion of the riders pay 10 cents for rides between 2.5 and 4 miles, that taxes are negligible and that the management is efficient and popular. In this case the one-man bus is still holding its own against the two-man car, but whether it will hold its own against shorter-headway, lightweight, one-man car operation is much to be doubted. The proper place for this type of service would be in co-ordination instead of competition with the electric railway, for the rush-hour through-service feature is but one of many advantages that could be developed to a greater degree than at present.

TABLE VI—OPERATING COSTS OF A JITNEY BUS COMPANY USING DAY-ELDER CHASSIS WITH 23-PASSENGER BODY

Length of run up to 5 miles over smooth, granite and cobblestone paving	
Schedule speed of local service	10 m.p.h.
Non-stop rush-hour service approximately	13 m.p.h.
Fares 5 and 10 cents, against 6 and 12 cents on trolley	
Annual charges for bonding, license fees, taxes	$500
	Per Bus-Mile
Estimated cost of pneumatic tire upkeep	5.5 cents
Estimated cost of gasoline, 6 miles per gallon and gasoline at 25.5 cents per gal.	4.25 cents
Wages one-man bus 50 cents an hour at 10 m.p.h.	5.00 cents
Wages of supervisory staff, say 20% of platform	1.00 cent
Inspection, repairs, etc.	Too early to figure

MANUFACTURER'S ESTIMATE

(Courtesy of Lang-Warden Motors, Inc., New York)

Day-Elder 1.5 to 2-ton chassis with twenty-three-seat bus, extra pair of tires, war tax, freight, etc., approximately	$4,729.00
Fixed Expenses:	Per Annum
Interest on investment ($4,729) at 6%	$283.74
Overhead, and repairs twice a year	500.00
Garage rent	360.00
Drivers, two at $30 each for fifty-two weeks	3,120.00
Total fixed expenses	$4,263.74
Operating expenses:	Per Bus-Mile
Tires, based upon 8,000 miles guarantee	$0.05952
Gasoline, 12 miles per gallon at 27 cents	.02250
Oil, 150 miles per gallon at 60 cents	.00400
Grease	.00100
Depreciation, based upon 100,000 miles	.04729
Total	$0.13431

Recapitulation:	Per Bus-Mile	Per Annum
Fixed expenses for 150 miles a day for 300 days or for 45,000 miles per annum, costing $4,263.74	$0.09475	$4,263.74
Operating expenses for 150 miles a day for 300 days.	.13431	6,043.95
	$0.24906	$10,307.69
Approximate over-all cost, exclusive of bonding, license fees, taxes	25 cents per bus-mile	

NOTES

Manufacturer's service or maintenance plan for one year covers semi-monthly inspection, which includes tightening of all nuts, greasing of working parts, readjustments, detail report of condition to owner, etc., without cost, except for lubricants.

Foregoing estimate assumes wholesale operation with, say, 15 per cent reserve. Hence the individual bus is treated as if in daily use throughout year on two-shift basis.

Garage rental is based upon large city operation and would be less in medium-size cities.

Estimated gasoline consumption is considerably higher than actual operation over highways including much rough paving.

ELECTRIC RAILWAYS SHOULD NOT COMPETE WITH THEMSELVES

From the review of the operations of jitney men and jitney companies, we may now pass to the motor bus operations of electric railways, which have gone through a peculiar development and which are still in a state of flux.

It will be recalled that when the jitney plague de-

TABLE VII—OPERATION OF FLEET OF 1.5—2-TON WHITE CHASSIS WITH SIXTEEN-SEAT SUBSTANTIALLY BUILT BODY AS OPERATED BY AN EASTERN ELECTRIC RAILWAY

Length of run, approximately	2.5 miles	
Service given from	7 a.m. to 12 midnight	
Schedule speed averages	7.75 m.p.h.	
Transportation earnings per bus-mile, with 6-cent fare, approximately	35 cents	
Cost of bus, exclusive of heaters, fare box, etc.	$6,100	
Weight of bus, 6,970 lb., or	436 lb. per seat	
Annual performance per bus, approximately	18,000 miles	
Operating Expenses:*	Cents per Bus-Mile	
Maintenance of Equipment:		
Superintendence	0.58	
Chassis repairs	3.10	
Body repairs	0.81	
Tire upkeep and renewals (28,000-mile solid)	1.60	
Shop expenses and accessories	0.26	
Depreciation (25 per cent per annum)	6 60	
		12 95
Conducting Transportation:		
Superintendence	0.58	
Platform wages (one man, 46 cents an hour)	7.50	
Dispatchers and street supervision	1.14	
Garage employees and expenses	0.92	
Service-car expenses	0.13	
Cleaning and oiling	1.20	
Gasoline (4.6 miles per gallon)	5.70	
Lubricating oil	0.11	
		17.28
General and Miscellaneous:		
Salaries general officers and clerks	0.96	
Miscellaneous office expenses, printing, etc.	0 31	
Injuries and damages	2.11	
Insurance	0.53	
Stores and miscellany	0.39	
		4.30
Total operating expenses, including depreciation		34.53
Fixed Charges:		
Interest and discount	4.10	
Taxes	1.60	5.70
Total operating and fixed charges		40.23

* The following costs are not absolutely exact, owing to certain changes arising during the fiscal year, but they are accurate within a cent or two per mile over all.

scended upon the United States in 1914 and after, several electric railways undertook a little jitney operation *sub rosa* to see what was in the gassed thing. Thus arose the odd spectacle of a railway competing with itself as well as with the interloper. It was expensive business, and usually a few weeks were enough to convince the electric railway that it couldn't run a jitney as cheaply with hired men as the man who owns or rents and repairs his own car. Here and there, however, the jitney developed into a more legitimate bus service openly conducted by the railway. One of these, which is deservedly popular, is in operation in a large Eastern city. Unfortunately, it is still being run at street railway fares and it has not yet been rerouted sufficiently to serve the twofold purpose of less poaching on the railway service and a faster, more direct run between terminals. At 5 and 6-cent fares these buses lost money. At 7 cents they threaten better results on a route a little more than 2.9 miles long. Table VII shows that these sixteen-seat motorbuses cost 34.53 cents per bus-mile. The depreciation item is rather liberal for this make of chassis. On the other hand, no charge was made for garage rental or for management. The table also indicates that the buses are not routed to secure free running, as their schedule average of 7.75 m.p.h. (aside from idle miles constituting a further loss) is certainly low for a vehicle of such small capacity and results in higher platform cost and lower bus-hour intake. The earnings of 35 cents per bus-mile were not enough to carry operating expenses and overhead.

The legitimate field for a service of the foregoing character would be as an alternative higher-fare route to relieve a nearby congested car street, thereby assuring higher schedule speed for the bus and some measure of relief to the cars.

In the heyday of electric railway construction in America there were built a great many extensions into open country under pressure from real estate or amusement park interests. Many of these extensions continue a loss down to the present day, while the most promising of them required years and years to reach the stage where revenue exceeded expenses.

Buses Postponed Costly Track Extensions

In the following discussion of the San Francisco bus operations, as well as other bus services, it will be seen that such costly track extensions can now be avoided through the inauguration of a motor bus service. It would be unfair to expect the motor bus to show a profit for such pioneering in thin territory, especially when it is treated as part of a universal-fare street railway system. All that can be justly expected is that it should handle this thankless class of business at a lower over-all cost than would be possible with an electric railway. It would be difficult to make most of these extension routes self-supporting in any case, but it may be respectfully suggested that the users of such facilities be assessed an additional increment of fare, whether it be 2, 3 or more cents per mile. Such a plan is fairer than that of favoring still further the passenger who rides to the very end of the trackway!

Tables VIII, IX and X tell the operating tale of the service given with White motor buses, first on four, then on three and now on two extensions of the San Francisco Municipal Railway. These routes are described in Article II of this series, so that it is only necessary to recall that Route 1 is a twelve-minute headway extension across Golden Gate Park, the trolley route being 4.8 miles and the bus extension 2.08 miles long, and that Route 2 is a fifteen-minute headway extension along Great Highway (ocean shore), the trolley route being 7.06 miles and the bus route 1.12 miles long. Route 3, discontinued April 12, 1919, had a ten-minute headway, and it was possible on it to get a 6.04-mile trolley ride and a 1.70-mile bus ride for 5 cents, as on the other routes. Route 3 in itself was a consolidation of Routes 3 and 4 made to reduce losses.

Under the circumstances, it would be hopeless to expect a profit from a motor bus service. Thus, in 1918, the total receipts from motor bus operation after due allowances were but $27,479.40, whereas the cost, despite no tax or license charges, was $53,817.61, leaving

TABLE VIII—OPERATION OF WHITE 2-TON MODEL TDB CHASSIS WITH NINETEEN-SEAT BODY (7,830 LB., OR 412 LB. PER SEAT LIGHT) USED BY SAN FRANCISCO MUNICIPAL RAILWAY, CALENDAR YEAR 1918

(Figures courtesy of the White Company, San Francisco Office)

Investment:		
Five-Model TDB White truck chassis f.o.b. San Francisco at $4,255...		$21,275.00
Five motor bus bodies at $2,000		10,000.00
Total investment		$31,275.00
Estimated Cost of Operation, including Fixed Charges:		
Interest on investment at 6%		$1,876.50
Insurance on fleet of five cars as follows:		
Fire and theft	$350.28	
Public liability	250.00	
Property damage	100.00	
Collision	652.50	
Employers' liability	675.00	
		$2,027.78
Licenses (exempt)		
Taxes (exempt)		
Storage		300.00
Actual fuel consumption, 47,352 gal. distillate at 10 cents*		4,735.20
Actual oil consumption, 4,128 gal. at 29 cents		1,197.12
Actual tire cost, 294,889 miles at 6.5 cents per mile		19,167.78
Repairs—Labor and parts		3,125.82
Actual wages of drivers (50 cents an hour)		15,132.41
Depreciation at 20 per cent per annum		6,255.00
Total cost		$53,817.61
NOTE: Repairmen's wages	68.75 cents an hour	
Cleaners' wages	56.25 cents an hour	
Machinists' wages	$1.00 an hour	
Total number of passengers carried		1,023,298.00
Receipts from motor bus operation		$27,479.40
Loss on motor bus operation (estimated)		$26,338.21
Total cost per bus-mile		18.25 cents

Distillate consumption, 6.2 miles per gallon.

* Unsatisfactory; to be replaced by straight gasoline.

a deficit of, say, $26,338. The cost of operation per bus-mile, including the overhead as detailed in the table, was 18.25 cents. Inasmuch as there were no license, tax or management charges, it will be seen that the cost of these nineteen-seaters must have been at least 1 cent per seat-mile. California wages, it will be observed, are high, whereas fuel is much less. The use of the more comfortable pneumatic tire enhances the tire charge.

Table IX shows that advancing costs in 1919 raised the expenses per bus-mile to 23.6 cents, whereas the earnings per bus-mile were but 12 cents. In this case the net loss on this accommodation service was $30,-124.05. In January, 1920, receipts were 12.6 cents and outgo 27.3 cents per mile. Part or all of this loss may have been recouped by the city of San Francisco through the enhancement of suburban realty values, but this kind of set-off is not open to a privately owned electric railway.

Official Comment on San Francisco Bus Operation

Through the kindness of F. Boeken, superintendent San Francisco Municipal Railway, further data (January, 1920) and the following general facts have been made available:

Mr. Boeken says that January may be considered an average month (this being the Pacific Coast) so far as bus performance goes. Table X shows each bus in service averaged 158 miles daily, but 180 miles a day is nearer the usual performance. Two other buses were in the shop for repairs during this month, so that the actual mileage per bus owned would have to take this 33⅓ per cent reserve into account.

The total cost of these six buses, delivered and ready to operate, is placed at $34,345.05. Experience has shown that owing to the very small revenue per mile earned by these suburban buses the setting aside of 18 per cent of the cash receipts (14 per cent for depreciation and 4 per cent for injuries and damages, as in the case of the electric cars) is not sufficient to cover depreciation. The compensation insurance item in these tables is a fund set aside for the care of injured employees, in compliance with State law. The $1.99 rate applies to the bus drivers and the $2.49 rate to the shop mechanics.

Hitherto the buses have been using a mixture of gasoline and distillate in the ratio of two to one, but owing to the difficulty experienced in starting and because of the tendency to carbonize straight gasoline will prevail hereafter.

Up to April 1, 1920, five of the buses had been in operation for twenty-seven months (from January, 1918) and the sixth bus just twelve months. Up to Dec. 31, 1919, the first five buses had averaged 110,000 miles each. By the second year's operation maintenance had increased to the point where one of the five machines was always in the shop. In order to maintain the schedules, the city has ordered two more buses, which, like the others, will have White chassis.

Finally, Mr. Boeken's statement on the transportation value of the motor bus may be quoted verbatim:

"These bus lines are operated in an outlying, sparsely settled district and serve as temporary extensions of the Municipal Railway's main lines. While the experience with these buses has, to a certain extent, been costly to the Municipal Railway, they have served as a means of transportation for some people who heretofore have been without any transportation. They have also saved the Municipal Railway the expense of building unprofitable extensions. Still, I do not feel that our experience could be considered as a criterion in judging the merits of motor bus transportation as compared with street cars. However, I do not believe that motor bus transportation will ever entirely supersede the electric street railway unless some style of bus is developed along lines different from any so far tried out in this country."

Trolley Car Losses Would Have Been Greater on San Francisco Extensions

That Mr. Boeken is right in assuming that trolley car operation would have led to greater losses will be obvious from a brief calculation. The total length of route operated early in 1919 with motor buses approximated 5 miles. At a construction cost of $70,000 per mile, or $250,000 total, the fixed charges on the permanent way would have cost 6 per cent of $350,000, or $21,000 per

TABLE IX—OPERATION OF SAN FRANCISCO MUNICIPAL RAILWAY BUSES FOR CALENDAR YEAR 1919

(Courtesy the White Company)

Receipts Route 1	$13,341.85	
Receipts Route 2	7,229.50	
*Receipts Route 3	2,276.05	
Receipts total		$22,847.40
Operating Expenses:		
Repairs to buses owned	$12,357.57	
Platform expenses	16,360.90	
Garage expense	11,446.84	
**Rental of buses	592.50	
Tire expense, varying from 5.5 to 7.5 cents per bus-mile	16,143.10	
Total operating expense		$56,900.91
Operating loss		$34,053.51
Reserves:		
Depreciation (18% of receipts)	$4,112.53	
Compensation insurance	529.16	
Total reserves		4,641.69
Total operating and overhead expenses		$61,542.60
Gross excess of expense over revenue		$38,695.20
Revenue Credits:		
Comprising 5-cent tickets, 2½-cent school tickets and transfers credited at 2½ cents each		8,571.15
Net loss		$30,124.05
Total bus-miles		260,324
Receipts per bus-mile, exclusive of credits		$0.188
Receipts per bus-mile, inclusive of credits		.120
Expenses per bus-mile, including overhead		.236
Net loss per bus-mile		.116

* Route No. 3 discontinued April 12, 1919.
** Rented bus discontinued March 21, 1919.

TABLE X—OPERATION OF SAN FRANCISCO MUNICIPAL RAILWAY BUSES JANUARY, 1920

(Courtesy F. Boeken, Superintendent)

Receipts Route 1	$1,272.05	
Receipts Route 2	529.30	
Total receipts		$1,801.35
Operating Expenses:		
Repairs to buses owned	$1,532.16	
Platform expenses	1,329.15	
Garage expense	1,004.06	
Total operating expenses		3,865.37
Operating loss		2,064.02*
Reserves:		
Depreciation (18 per cent of receipts)	$324.24	
Compensation insurance ($1.99 on $1,700.50 and $2.49 on $955.95, or $33.84 and $23.80, respectively)	57.64	
Total reserves		$381.88
Gross excess of expense over revenue		$2,445.90*
Revenue Credits:		
Comprising a few 5-cent tickets, with school tickets and transfers credited at 2.5 cents each	$666.45	$666.45
Net excess of expenses over revenue		$1,779.45**
Tire Expense:		
19,510 miles at 5.5 cents		$1,073.05
Net loss, tire expense included		$2,852.50 *
Daily net loss, tire expense included		92.02
* Tire expense not included.		
** After crediting bus lines with proportionate transfers and tickets.		
Total bus-miles		19,510
Receipts per bus-mile, exclusive of credits		$0.092
Receipts per bus-mile, inclusive of credits		.126
Expenses per bus-mile, including overhead		.273
Net loss per bus-mile		.147

TABLE XI—OPERATION OF FOUR STUDEBAKER SIXTEEN-PASSENGER MOTOR BUSES FORT WAYNE, IND., MARCH 15 TO DECEMBER 31, 1917, INCLUSIVE

(Courtesy Sam W. Greenland, General Manager)

Connection made between two trolley routes one mile apart in residentia district:

Cost of four buses	$5,861.00	
		Cents per Bus-Mile
Mileage	93,012	
Gross revenue	$5,345.23	5.75
Total cost, operation and overhead	11 240.00	12.084
Detail of Expenses:		
Repairs (Labor and material)	1 344.45	1.445
Front tires	279.43	0.300
Rear tires	682.40	0.734
Tire repairs	84.53	0.091
Lamps	8.34	0.009
Battery repairs	53.91	0.058
Cleaning	47.57	0.040
Gasoline and oil	2,543.02	2.734
License fee	74.00	0.080
Liability bond	80.00	0 086
Depreciation	2,950 00	3.172
Driver's wage	3,102.35	3.335

TABLE XII—OPERATING STATEMENT FOR SIX MONTHS OF 1919 FOR ONE-TON MORELAND MOTOR BUS, FRESNO TRACTION COMPANY

(Courtesy F. W. Webster, General Manager)

Service	Feeder to electric line	
Fare	6 cents, transfers free	
Operating revenue, including $51.48 of 2.5 cent tickets		$1,369.38
Operating Expenses and Overhead:		
Maintenance supplies	$79.23	
Maintenance labor	132.78	
Salaries	1,254.26	
Gasoline and oil		
Depreciation	457.86	
Rent of equipment	505.20	
Miscellaneous	21.25	
		$2,450.58
Net loss from operation		1,081.20
Interest on investment—6 months at 6%		144.96
Total loss for six months		1,226.16
General Data:		
Cash passengers		21,965
Transfer passengers		27,705
Ticket passengers		2,055
Passengers carried		51,275
Miles operated		10,044
Average earnings per mile		$0.1363
Average expenses per mile		$0.2439

annum. The most economical operation, of course, would be with safety cars. In 1919 six such cars would have cost delivered about $36,000, which at 6 per cent interest would have added $2,160 a year to the fixed charges. It may be assumed that the cost of safety car operation, covering the usual operating accounts (way and structure, equipment, power, conducting transportation, traffic, general and miscellaneous), would have been 18 cents per car-mile. As the total revenue per vehicle-mile was but 12 cents, safety car operation costs would fall short 6 cents per car-mile, or $18,000 per annum, on the basis of 300,000 car-miles on three routes. Adding this deficit of $18,000 to the overhead charges of $21,000 on permanent way and $2,160 on rolling stock gives a total deficit of $41,160. To this total we must add $6,480 a year, or 18 per cent of the receipts (which may be placed at 12 cents on 300,000 miles, or $36,000), plus another $530 for compensation insurance. The grand total then will be $48,170 per annum, or a deficit of 16 cents per car-mile. This compares with 11.6 cents deficit per bus-mile on the basis of the 260,324 bus-miles actually run. In all probability the losses with electric railway operation would have been greater rather than below the estimate made. The fact that the car service would offer almost twice as many seats is of no significance, as the need for such capacity has not arrived. If the buses, then, failed to make money in this thankless work, they certainly lost less than a trackway.

Fort Wayne Has Had to Cut Off All Unprofitable Service

Table XI shows the intake and outgo of four Studebaker sixteen-passenger buses which were operated from March 15 to Dec. 31, 1917, by the Fort Wayne & Northern Traction Company, Fort Wayne, Ind., to give crosstown service between two trolley routes 1 mile apart. The route was through a residential district, with little opportunity for other than transfer riding. This is indicated by the fact that the revenue was but 5.75 cents per bus-mile, whereas the operating and overhead charges then totaled 12.084 cents per bus-mile. Of this amount per bus-mile 3.172 cents was charged to depreciation. In view of the fact that this company is in receivership, it is not remarkable that it has discontinued this costly accommodation for the same reason that it is taking up unprofitable amusement park trackage.

Extension Services at Fresno, Palo Alto and San José, California

Table XII is an operating statement for six months of 1919 of a one-ton Moreland motor bus run by the Fresno Traction Company as a feeder. To use the succinct phrase of F. W. Webster, general manager of this company: "For financial result, see attached statement." The high spots are an over-all expense of 24.39 cents per mile (exclusive of fuel and oil), against a revenue of 13.63 cents per mile. The average revenue per passenger was only 2.67 cents, for 27,705 passengers rode on transfers.

Table XIII details the story of four months' operation in 1913 of a bus feeder line by the Peninsular Railway between Palo Alto, Cal., and the army camp at Fremont. The fare of 10 cents included transfer privileges to or from Palo Alto city cars. F. E. Chapin, general manager, advises that in operating this line it was found that the overloading during certain times of the day had a far more disastrous effect on the equipment than it would have had on ordinary electric motors.

TABLE XIII—OPERATION IN 1918 BY PENINSULAR RAILWAY OF BUS FEEDER LINE BETWEEN U. S. ARMY CAMP AT FREMONT AND PALO ALTO TO CONNECT WITH PALO ALTO CITY CARS AND INTERURBAN CARS FOR SAN JOSE

(Courtesy F. E. Chapin, General Manager)

Fare each way with transfer privilege to or from Palo Alto city cars.... 10 cents
Equipment—One 2-ton Moreland truck converted to thirty-eight-seat bus and one 40-hp. Fadgl auto bus seating eighteen.
Operation over paved highways.

Operating Statement First Four Months of 1918

Month	Expenses	Revenues	Loss	Miles Run	Earnings, Bus-Mile	Average Expense Bus-Mile
January	$400.85	$152.00	$248.85	1,280	11.88	31.32
February	500.81	444.35	56.46	2,709	16.40	18.48
March	637.40	508.20	129.20	2,995	16 96	21.28
April	521.87	87.70	434.17	1,129	7.77	46.22

NOTE—Expenses include only items of cost connected with the buses, such as material, supplies and labor for repairs, wages of drivers, gasoline and oil, depreciation and miscellaneous items connected with operation. Expenses do not include any overhead charges, such as superintendence, advertising, cost of tickets, injuries and damages, nor interest on investment.

TABLE XIV—OPERATION BY SAN JOSE RAILROAD OF BUS FEEDER LINE DAILY ON HOBSON STREET AND ON MONTEREY ROAD ON SUNDAYS AND HOLIDAYS

(Courtesy F. E. Chapin, General Manager)

Fare on Hobson Street with city car transfer privilege..... 6 cents
Fare on Monterey Road with city car transfer privilege..... 10 cents
Equipment—One 1-ton Ford truck converted to twelve-seater
One 40-hp. Fadgl auto bus seating eighteen.
Operation over paved highway on Monterey Road and on gravel and waterbound macadam on Hobson Street.

Operating Statement Last Five Months of 1919 and January, 1920

Month	Expenses	Revenues	Loss	Miles Run	Earnings, Bus-Mile	Expenses, Bus-Mile
August	$474.84	$117.90	$356.94	2,035	$5.79	23.32
September	525.41	86.63	438.78	2,003	4.33	26.23
October	556.25	111.01	445.24	2,036	5.45	27.32
November	577.36	110.91	467.17	2,030	5.43	28.44
December	497.66	98.07	399.59	2,036	4.82	24.44
January	730.15	88.46	641.69	2,036	4.34	35.86

NOTE.—Expenses cover same items as in Table XII.

The buses were also more stuffy and disagreeable when it was necessary to inclose them during wet weather than is the case with the more substantial and more spacious electric car. The extremely low density of traffic is indicated by the fact that a 10-cent fare brought only a maximum of 16.96 cents per bus-mile.

Table XIV shows the operation by the same management of a bus feeder service at San José, also in connection with the city car transfer privilege, except that a 6-cent fare prevails on the route operated weekdays and a 10-cent fare on the route operated on Sundays and holidays. A maximum earning of 5.79 cents per bus-mile indicates the starvation character of this service. As a matter of fact, Mr. Chapin advises that his company secured permission to abandon two wornout, remote and unprofitable narrow-gage lines only on condition that it run this bus service until the expiration of the original franchise period. Here is a hint to others who are operating a long stretch of desert track!

In view of the extraordinary jitney bus development in California, it is also interesting to add that more than two years ago Mr. Chapin operated an auto bus connecting with the cars at Bascome and running to Los Gatos via Campbell, a distance of about 8 miles over a route different from that taken by the electric cars. This route proved no more successful than the service detailed in Tables XIII and XIV and was given up.

While the bus services conducted by Mr. Chapin were (or are) obviously too thin for any kind of commercial transportation, it may be interesting to quote his statement: "Our experience has been proved that the electric service is more dependable and comfortable to the passengers and can be performed more economically than service by auto bus."

TABLE XV—REPORT OF FIFTH AVENUE COACH COMPANY, NEW YORK, FOR FISCAL YEAR ENDED JUNE 30, 1919

(Preliminary Report to Public Service Commission)

Number of passenger buses owned at close of year		279	
Average number of passenger buses operated		233	
Bus-hours		1,002,006	
Bus-miles (including 125,551 idle miles)		8,002,026	
Schedule speed		8.2	m.p.h.
Net mileage per hour		7.98	m.p.h.
Passengers carried at 10 cents each		36,488,447	
	Total	Per Bus-Mile, Cents	
Income Statement:			
Total fares (46.21 cents per active miles)	$3,648,845	45.12	
Livery service (65,101 miles)	53,659	0.66	
Advertising and miscellany	40,194	0.50	
Total revenue from operation	$3,742,697	46.28	
Maintenance:			
(Superintendence $44,290; shop expenses $18,131)	$62,421	0.77	
Repairs (bus bodies and chassis, $283,556)	299,626	3.71	
Tires (solid)	76,595	0.95	
Depreciation	82,503	1.02	
Conducting transportation	1,591,640	19.68	
Accidents and damages	103,682	1.28	
Traffic—advertising	8,766	0.11	
General and miscellaneous	122,360	1.51	
Total operating expenses	$2,347,594	29.03	
Taxes	486,790	6.02	
Total revenue deductions	$2,834,384	35.05	
Income from operation	$907,553	11.22	
Non-operating income	42,168		
Gross income	$949,721		
Income Deductions:			
Rent	$78,540		
Interest	27,225		
Total	$105,763		
Net income for year	$843,958		
Surplus adjustments	228,061		
Net surplus	$615,897		

TABLE XVI—VARIATIONS IN REVENUE AND EXPENSES IN CENTS PER BUS-MILE, FIFTH AVENUE COACH COMPANY, 1913–1919, FISCAL YEARS ENDED JUNE 30

Year	1913	1914	1915	1916	1917	1918	1919
Total revenue from operation	42.51	38.93	35.12	33.48	38.21	33.91	46 28
Operating expenses, including taxes	35.05	32.20	24.49	23.37	27.68	29.01	35.05
Gross income from operation	7.46	6.73	10.63	10.11	10.53	4 90	11 23

TABLE XVII—VARIATIONS IN PRINCIPAL OPERATING ITEMS, IN CENTS PER BUS-MILE, FIFTH AVENUE COACH COMPANY, 1912–1919, FISCAL YEARS ENDED JUNE 30

Year	1912	1913	1914	1915	1916	1917	1918	1919
Conducting transportation	17.56	18.25	18.88	11.47	12.22	15.32	16.32	19 68

NOTE.—"Conducting transportation" includes superintendence, fuel, lubricants, platform men, miscellaneous stage service employes, lighting buses, miscellaneous stage service expenses, washers and cleaners; other garage employees, cleaning material, other garage expenses and other transportation expenses.

	1912	1913	1914	1915	1916	1917	1918	1919
Maintenance of plant and equipment	10.37	12.83	9.40	6.75	6.47	6.45	6.43	6.44
Of which tires cost	3.13	....	....	....	....	0.79	0.82	0.95
Maintenance of bus equipment	7.21	10.02	7.48	5.47	4.59	3.50	3.19	3.70
Depreciation	*5.31	2.81	1.92	1.28	1.88	1.25	1.72	1.02
Taxes	2.70	2.50	2.50	2.23	2.02	2.79	3.48	6.02

* In 1912 depreciation was given as 33⅓ per cent. per annum. Estimate for 1920 fiscal year is 1.9 cents per bus-mile.

NOTE.—"Maintenance of plant and equipment" includes superintendence, repairs of buildings and structures, repairs of shop tools and machinery, shop expenses, repairs of omnibus bodies, material and labor; repairs of omnibus chassis, material and labor; depreciation of tires, repairs of service cars, depreciation of equipment, depreciation of shop tools and machinery.

WHAT FIFTH AVENUE BUSES ARE DOING

The pioneer motor bus company in the United States is the Fifth Avenue Coach Company, which is controlled by the New York Transportation Company. The latter company in turn is controlled through stock ownership by the Interborough-Consolidated Corporation, which holds either directly or indirectly, through certain directors, about 57 per cent of the 235,000 $10 shares outstanding. For the greater part of its motor bus life, in fact, the Fifth Avenue Coach Company has been controlled by the predominant traction interests of old New York. It is important to bear this fact in mind for two reasons: First, it accounts for the development of the bus business on a frankly supplementary rather than on a competitive basis; second, the backing of the company was powerful enough to prevent the entrance of competitors who, it may be said, had a rather rosy idea of the profits of the company.

In the early days of the company routes and rides were very short and earnings per bus-mile were correspondingly high, but the fly in the ointment was the lack of a dependable gasoline vehicle. In later years a high standard of excellence has been attained in reliability of service and traffic has grown enormously with the extensions of the routes, but the rate of fare, fixed by statute, remains at 10 cents in the face of higher wages, higher fuel and other increases in expense. Thus John A. Ritchie, president of the company, testified on May 16, 1919, before the Illinois Public Utilities Commission that the uncontrollable increases in expenditure for the twelve months ended March 31, 1919, because of higher labor, advances in material and war taxes, amounted to $483,000, reducing the possible net earnings from $1,100,000 to an actual net earning of $686,000.

A more comprehensive idea of this company's operations is obtainable from its annual reports to the New York Public Service Commission of the First District. Table XV shows the report for the fiscal year ended June 30, 1919, the best in the history of the company. The *de luxe* character of the service is indicated by the

fact that these forty-eight seat double-deck buses averaged 4.5 passengers per bus-mile. The total earnings per bus-mile from all sources were 46.27 cents, operating expenses exclusive of taxes were 29.03 cents and operating expenses inclusive of taxes were 35.05 cents. Income from operation was 11.22 cents, or $907,553.08. The net surplus was $615,897.06.

If this had been a regular kind of year, one could justly conclude that double-deck, two-men motor bus operation at a flat fare of 10 cents was a glorious bonanza. This is not so. The surplus quoted looks very good, but it is also a fact that on June 30, 1912, the company had a deficit of $416,977.82. From that year onward the deficit was reduced and turned into a surplus. However, a glance over the intervening years, as presented in Tables XVI and XVII, will disclose how much the prosperity of a *de luxe* bus company depends upon weather conditions or upon occasions that influence the amount of transient traffic.

The year ended June 30, 1919, produced the top earnings of 46.27 cents a mile for two outstanding reasons: A mild, practically snowless winter, which permitted riding on the open top deck almost every day; an extraordinary amount of visitors' patronage, due to the return of hundreds of thousands of soldiers via the port of New York, and the peace-time festivities and the arrival of friends and relatives to greet the incoming soldiers. In contrast, we have the preceding year, when the gross earnings were but 33.91 cents a bus-mile because of a bitter winter. These fever-chart fluctuations are very different from the customary steady annual rise in electric railway gross earnings. They prove that the profit-bringing part of the bus clientèle is made up of casual rather than regular riders. There are, of course, a considerable number of natives who like to ride the open top deck in fair weather, but "when the breezes blow, they generally go below" into the nearby subways or make use of the closed surface cars. The winter of 1919-20 must have been the worst in the history of the company, and its effect will certainly be reflected in the report for the current fiscal year. The fact that the company operates over the show street of New York was a bit of good luck, because the city made strenuous efforts to clear it as quickly as possible, although the bus company also did its best.

The bus-mile figures given in Tables XVI and XVII are not absolutely exact because the preliminary annual reports submitted to the commission are made up differently from the long-delayed annual reports as corrected for final publication by the commission. They are close enough, however, for all practical purposes. As previously noted, the total operating revenue per bus-mile has been extremely variable, ranging from 33.48 cents in 1916 to 46.27 cents in 1919. If we make a non-equated average of the figures from 1913 to 1919 inclusive we get 38.35 cents, which would leave only a margin of 3.30 cents over the operating expenses and taxes. The continued prosperity of the company therefore is predicated on no further advance in cost or else a higher earning per bus-mile through higher rate of fare, preferably by zoning.

Possibilities of Cost Increases

As to the probability of no further advance in cost, the actual case is that there must have been a big advance in cost over the high figures for the last fiscal year. Wages were advanced 20 per cent or more early during the current fiscal year, and gasoline, aside from other items, has seen several increases in price. A 20 per cent increase in the payroll is serious enough, yet a further 10 per cent increase is also pending.

Also, according to the paper of Geo. T. Green, general manager Fifth Avenue Coach Company, New York, on "Motor Bus Transportation in New York" (see ELECTRIC RAILWAY JOURNAL, July 24, 1920), the yearly gasoline bill is now $500,000, so a 20 per cent advance in that item would be equivalent to $100,000. In the fiscal year ended June 30, 1919, fuel cost $302,193, or 3.74 cents per bus-mile.

Examining the unit expenses of past years, it will be noted that the earlier crest in "conducting transportation" was in 1914, when the company had but an average of 111 buses in daily service, compared with 233 in 1919. Since the fiscal year 1915 this item has been rising steadily. The item of "maintenance of plant and equipment" reached its zenith in 1913 with the figure of 12.83 cents a mile, and by 1919 had been cut almost in half through improvements in the buses, smaller overhead charges per bus-mile operated, etc., as indicated by corresponding decreases under the sub-item "maintenance of equipment." It will be noted that the latter rose 0.51 per mile from 1918 to 1919, and there is no reason to anticipate a reduction in 1920. "Tires" show a great reduction since 1913, but they have also advanced in recent times. "Depreciation," was placed at 1.02 cents per bus-mile in 1919, but under date of Dec. 17, 1919, the Fifth Avenue Coach Company advised the New York Public Service Commission of the First District that the depreciation allowance from 1915 to 1919 fiscal years plus July 1-Oct. 31, 1919, should have been 1.98 cents per bus-mile instead of actual credit of 1.19 cents—a difference of $271,830. The company estimated that 1.90 cents would be a proper figure as per experience of the period Jan. 1-Oct. 31, 1919. Maintenance during the same period was 7.25 cents. This compares with 6.4 cents in 1919 fiscal year.

Finally, it will be observed that the item of "taxes" (indicating taxation of other income) has advanced to 6.02 cents per bus-mile, or 13 per cent of the gross earnings per bus-mile. Truly, nothing is as certain as death and rising taxes.

TABLE XVIII—CHICAGO MOTOR BUS COMPANY—STATEMENT OF OPERATION FOR YEAR ENDED JUNE 30, 1919

Gross Earnings	Twelve Months to Date	Cents per Bus-Mile
Transportation revenue	$499,469	36.53
Special bus revenue	463	0.03
Advance revenue	4,175	0.31
Total operating revenue	$504,107	36.87
Non-operating revenue	1,365	.10
Total revenue	$505,472	36.97
Operating Expenses		
Maintenance of way and structures	$409	0.03
Maintenance of equipment	141,580	10.35
Depreciation reserve	44,270	3.24
Gasoline expense	56,290	4.12
Conducting transportation	168,470	12.32
Traffic expenses	2,558	0.19
General and miscellaneous expenses	61,604	4.50
Taxes	19,239	1.41
Total operating expenses	$494,423	36.16
Net earnings	11,049	0.81
Fixed Charges:		
Interest on funded debt	11,791	0.86
Interest on unfunded debt	1,182	.09
Discount on funded debt	7,961	0.58
Total fixed charges	$20,935	1.53
Net income deficit	9,886	0.72
Revenue bus-miles	1,367,413	.....

TABLE XIX—MONTHLY STATEMENT OF REVENUE MILES, CHICAGO MOTOR BUS COMPANY,

For the Year Ended June 30, 1919

1918	Revenue Miles	Total Revenue
July	159,111	$61,629
August	129,877	56,771
September	107,867	37,931
October	95,244	32,578
November	93,738	28,227
December	97,373	27,742
1919		
January	96,609	29,667
February	95,580	26,859
March	109,431	35,670
April	111,771	41,227
May	129,603	52,519
June	141,209	69,107
Total	1,367,413	$499,932

TABLE XXI—COMPARATIVE CUMULATIVE STATEMENT, CHICAGO MOTOR BUS COMPANY,

For Three Months Ended March

	1920		1919	
Gross Earnings	First Three Months	Cents per Bus-Mile	First Three Months	Cents per Bus-Mile
Total operating revenue	$106,702	35.04	$92,197	30.57
Non-operating revenue	324	.11	426	.14
Total revenue	$107,027	35.15	$92,624	30 71
Operating Expenses				
Maintenance of way and structures	121	0.04	60	0.02
Maintenance of equipment	31,832	10.46	30,795	10.21
Depreciation reserve	9,909	3.25	9,885	3.28
Gas expense	13,666	4.49	12,464	4.13
Conducting transportation	44,682	14.68	35,361	11.72
Traffic expense	2	.....	366	.....
General and miscellaneous	15,752	5.17	14,981	4 97
Taxes	5,760	1.89	3,885	1.29
Total operating expenses	$121,727	39.98	$107,799	35.62

TABLE XX—STATEMENT OF OPERATIONS, CHICAGO MOTOR BUS COMPANY, FOR THREE MONTHS ENDED MARCH, 1920

Gross Earnings	Jan., 1920	Cents per Bus-Mile	Feb., 1920	Cents per Bus-Mile	Mar., 1920	Cents per Bus-Mile	Total	Cents per Bus-Mile
Transportation revenue	$30,268	30.65	$31,695	32.92	$43,209	39.48	$105,173	34.50
Special bus revenue	60	.06	30	0.03	.....	.....	90	0.03
Advertising revenue	330	0.34	661	0.69	447	0.41	1,439	0.47
Total operating revenue	$30,658	31.05	$32,386	33.64	$43,656	39.89	$106,702	35.04
Non-operating revenue	97	0.10	93	0.10	133	0.12	324	0.11
Total revenue	$30,756	31.15	$32,480	33.74	$43,790	40.01	$107,027	35.15
Operatiog Expense								
Maintenance of way and struetures	83	0.08	7	0.01	30	0.03	121	0.04
Maintenance of equipment	11,957	12.11	9,834	10.22	10,040	9.17	31,832	10.46
Depreciation reserve	3,226	3.27	3,135	3.26	3,547	3.24	9,909	3.25
Gasoline expenses	4,303	4.36	4,222	4.39	5,140	4.70	13,666	4.49
Conducting transportation	15,213	15.40	13,861	14.40	15,608	14.26	44,682	14.68
Traffic expenditure	.....	.....	.....	.....	2	.....	2	2
General and miscellaneous expense	4,761	4.82	4,574	4.75	6,416	5.86	15,752	5.17
Taxes	1,734	1.76	1,833	1.90	2,192	2.01	5,760	1.89
Total operating expense	$41,281	41.80	$37,468	38.93	$42,977	39.27	$121,727	39.98
Net earnings	10,524	10.65	4,988	5.18	812	0.74	14,700	4.83
Fixed Charges								
Interest on funded debt	265	0.27	265	0.27	265	.24	795	0.26
Interest on unfunded debt	665	0.67	998	1.04	386	0.35	2,050	0.67
Discount on funded debt	.....	.....	.....	.....	4,889	4.47	4,889	1.61
Total fixed charges	930	0.94	1,263	1.31	5,541	5.06	7,734	2.54
Net income	11,454	.....	.....	.....	4,728	4.32	22,435	7.37
Revenue bus mileage	98,750	.....	96,273	.....	109,439	.....	304,462	....

FAILURES AT CHICAGO AND ST. LOUIS

While the Fifth Avenue Coach Company had a margin of 11.23 cents between total operating revenue and expenses (taxes included) per bus-mile, the Chicago Motor Bus Company for the same fiscal year ended June 30, 1919, had only a margin of 0.81 cents to meet 1.53 cents per bus-mile in fixed charges. Hence, the recent bankruptcy.

The operating statement of the Chicago Motor Bus Company shown in Table XVIII indicates that the trouble was due to lower density of traffic than New York. The fifty-one-seaters of Chicago earned but 36.53 cents per mile from transportation alone, while the forty-four to forty-seven-seaters of New York in the same period earned 45.12 cents. There was less difference in operating expense, Chicago showing 36.12 cents against New York's 35.05 cents. However, there is reason to believe that the New York vehicles are easier to maintain and are kept in better condition. Table XIX is a mileage and revenue statement by months, showing the enormous difference in mileage given in summer and winter months, such as 159,111 miles in July and 96,609 miles in January, both thirty-one days, with the contrast in revenue—$61,629.50 against $29,667.90—still more striking. The New York bus traffic is far steadier.

To conclude the sad story of Chicago, Tables XX and XXI are presented showing revenues and expenses for the first three months of 1919 and 1920. The comparison in Table XXI shows that operating expenses were 39.98 cents per bus-mile in 1920 against 35.62 cents in 1919, while revenue rose from 30.71 cents to 35.15 cents. There was an operating deficit both years.

The latest victim to the 10-cent *de luxe* idea is the Missouri Motorbus Company, whose receiver obtained on July 1, 1920, a court order authorizing suspension of a service begun no longer ago than Feb. 9, 1920, with eleven sixty-seat double-deck buses.

CO-ORDINATED SERVICE DESIRABLE

In concluding this survey of the place of the motor bus the writer would summarize the position of affairs as follows:

No service duplicating railways should be operated except for traffic relief purposes.

Such service should be given by the local railway system.

Higher fares should be charged, preferably on a distance basis, wherever the bus offers superiority in speed and accommodations and also wherever it serves districts that are too sparsely settled to justify a permanent way.

Safe Car Windows

A RECENTLY invented laminated safety glass for use in car windows is being placed on the market. This consists of two sheets of ordinary glass between which is interposed a thin sheet of pyroxylin plastic. Hydraulic pressure and the application of the proper degree of heat weld the glass and the pyroxylin sheet together in a solid unit. The pyroxylin binder prevents any scattering of the fragments of glass in the event of violent breakage. It is claimed that the transparency of the glass is not appreciably reduced by the insertion of the plastic sheet.

Lubrication and Lubricants

Late Theories of Lubrication Are Discussed and the Effects of Different Conditions on the Lubricant to Be Used Are Pointed Out*

By G. B. UPTON, M. M. E.
Professor of Experimental Engineering Cornell University

THE value of lubrication is first in the fact that it brings friction losses in machinery to tolerably small amounts, losses which without lubrication would be intolerably large. Secondly, by reducing abrasion of metal moving past metal almost to the vanishing point, lubrication not only makes machinery possible which otherwise would be impossible but even makes the machinery long lived and free from repair expense.

The cost of lubrication should not be considered simply as the cost of the lubricant and its application. The lubricant should be credited with the power saved by reduction of frictions, the saving of wear of machinery and avoidance of wage and production losses, while machinery unlubricated, or less well lubricated, would be standing idle for repairs.

The coefficient of friction of a bearing is by definition the ratio of friction force at the surface of the shaft (tangential to the shaft) to the load force holding the shaft against the bearing. This load force frequently has no direct or proportional relation to the power being transmitted in the shaft. An ordinary shop line shaft furnishes a good example. The forces on its bearings are due to weight of shaft and pulleys, and to belt pulls, and these forces are substantially independent of power transmitted along the shaft.

When a lubricant is used the laws of friction of solids go utterly into the discard. The coefficient of friction goes from a value of around 0.2 for solids to anywhere from 0.001 to infinity with complete fluid friction. We commonly get, in bearings, coefficients of friction from 0.005 to 0.02, under actual running conditions; values less than one-tenth those for unlubricated conditions.

The coefficient can and does exceed unity for very light loads with fluid lubrication, and when lubrication fails and bearings "seize," tearing and welding metal into metal, the coefficient of solid friction exceeds unity and approaches infinity.

In the limiting case for fluid friction in a bearing, a case never reached, but only approached, by an actual bearing, the laws of fluid friction would appear to be that total friction is independent of load, directly proportional to speed, directly proportional to "viscosity" of the lubricant, and inversely proportional to the radial clearance of the bearing from the shaft (the thickness of the oil film). With total friction finite and independent of load the coefficient of friction is inversely proportional to the load.

In an actual bearing these laws of the limiting case for fluid friction are not realized. The first reason for this is that the thickness of the oil film between bearing and shaft is not constant, independent of the load. The load tends to squeeze the oil out. When, and as an increasing load thins the oil film, the fluid friction increases, and a sufficient load will break the oil film and bring about a change to solid friction. The laws of friction of an actual bearing, then, may be anywhere between the laws of "perfect fluid friction" on one side and plain solid friction on the other side, depending upon load, speed and properties of the lubricant.

Viscosity Is All Important

The most important single property of the lubricant is its "viscosity." This may be considered as a measure of the internal friction of the oil as layers or portions of the oil move with regard to each other. Water has low viscosity. Tar has a high viscosity. Viscosity is a property of a lubricant that works both for us and against us, but on the whole is necessary to the success of lubrication.

When a shaft is standing still in a bearing another property of an oil becomes important—the "surface tension" or "capillary." The molecules of a substance have an attraction for one another, and also may feel attractions for molecules or other substances, if those others are near enough as molecules know distances. At the surface where a liquid touches a solid the attractions of molecules of the liquid for the rest of the liquid, in one direction away from the contact surface, are in competition with the attractions in the other direction of the liquid molecules near the contact surface toward the mass of the solid. Usually the latter force is the stronger, and the liquid tends to climb and spread itself out on the surface of the solid, or "wets" the solid. The opposite case is possible, as witness the action of mercury; small portions of liquid mercury roll themselves up into little balls when lying on a surface of a solid, because mercury has a higher "surface tension" than almost any solid. The "wetness" of a liquid is the reciprocal function of the surface tension. Hot water is wetter than cold water, because the surface tension is less, and oils are much wetter than water, usually, for an oil film will displace a water film on a metal if it gets a chance to do so.

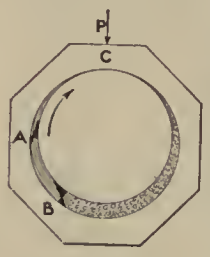


FIG. 1. OIL LAYERS TRY TO MOVE UP WITH SHAFT ROTATION

The wetness, or lowness of surface tension, of an oil gives it in a bearing a readiness to serve as a lubricant. If we feed oil to the crack between bearing and shaft, when the shaft is stationary, the oil will promptly crawl into the crack and fill it. The thinner the crack the harder does the oil try to get in, and the farther will it crawl. The force of this action is not big enough, unfortunately, to lift the shaft off the bearing on the loaded side. The best that the wetness of the oil can do for us is to get the clearance space of the bearing loaded with oil, so that when motion starts oil will be in place ready to begin lubrication after a fraction of the first revolution of the shaft; not more than a quarter turn is needed when circumstances are favorable.

*Abstracted from the *Sibley Journal of Engineering* for May, 1920, where the theory and mathematical calculations are given in extended form.

Few oils are unit, single substances chemically. They are solutions in each other of considerable numbers of substances. At the surface where the oil touches a solid the composition will be a bit different from that of the bulk of the oil, or we may say that the properties of an oil surface, such as viscosity, will be different from the properties that we find for the oil as tested in bulk. The thinner the oil film in our bearings the more important will such differences be. The layer of oil affected by this type of action is only a few molecules thick. This phenomenon we will call "adsorption."

We are quite familiar with the fact that the viscosities of oils change rapidly as temperature changes. Viscosity decreases, for an approximation, about as the inverse cube of the Fahrenheit temperature in the case of the ordinary mineral lubricating oils. For pressures of thousands of pound per square inch the effect of pressure on viscosity becomes important, and the increase of viscosity is with something like the square of the

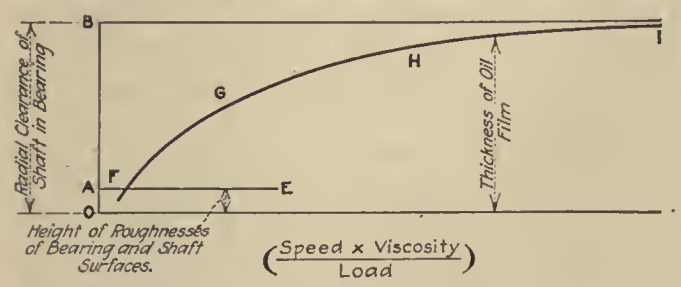


FIG. 2—RELATION BETWEEN THICKNESS OF OIL FILM AND FORCE RATIO

pressure. This action combines with the adsorption phenomena and together the two actions probably constitute "body," or "oiliness" of the lubricant, as far as that property may be distinguished from the viscosity which is measured at ordinary pressures. The distinction between "viscosity" and "body" is at times large.

The viscosity of a lubricant is the property principally concerned in the formation and maintenance of the lubricating film under ordinary running conditions of machinery. When a shaft is stationary in a bearing the oil usually coats the surface of the shaft more or less completely save on the side toward the load on the bearing. In that direction the load has squeezed the oil out, and metallic contact exists. This metallic contact may be on only a few points, with oil pools between, if the bearing and shaft are rough surfaced. If the surfaces are good the metallic contact is a portion of cylindrical surface with length parallel to the axis of the shaft, and over a cylindrical arc of 10 to perhaps 40 or 50 deg., depending on the load, the size of the shaft and the clearance between shaft and bearing (difference of radii of outside of shaft and inside of bearing).

How Is a Bearing Lubricated?

When the shaft begins to turn it tries to carry oil with it. As the rotation continues and speeds up a contest begins. The shaft tries to carry oil up onto the region where the load has been holding shaft and bearing in metallic contact. The bearing tries to wipe this oil off the shaft and keep the lubricating film from forming. The force which the bearing brings to bear to keep the oil out is the load. The force by which the shaft tries to bring oil in depends on the speed of the shaft, the form, dimensions and clearance of the bearing surface and on the viscosity of the oil. To move one layer of oil over another requires a force proportional to the product of the speed of the motion and the viscosity of the oil. Fig. 1 may show that in preventing the formation of the oil film the bearing would have to overcome this viscous force, proportional to the product of speed of shaft and viscosity of oil. It depicts the oil layers trying to move up with the motion of the shaft and being successfully held back by the bearing. Two approximate velocity traverse curves through the oil film are shown, at *A* and *B*.

At some critical value of the speed, as speed increases, the viscous force tending to form the oil film overcomes the load on the bearing, and the oil goes through, lifting the bearing on an oil film, and ending metallic contact and metallic friction. With further increase of speed above this critical speed, where solid friction ends and fluid friction begins, the oil film grows thicker. This thickening of the oil film does not, and cannot, go on indefinitely as the speed increases. The limit of film thickness is set by the radial clearance of bearing and shaft, or by concentric running of the shaft in the bearing. The higher the speed of the shaft and the viscosity of the oil the nearer will the thickness of the oil film approach the radial clearance as a limit. The thickness of the oil film, at which a bearing runs, depends on the ratio of the forces trying to form and to break the film, or it depends on the ratio of load to the product of speed and viscosity. Fig. 2 shows the form of the relation between thickness of oil film and the force ratio, using the force ratio in the reciprocal form from the preceding statement.

There is another action which in starting a shaft supplements the viscous force in getting the oil film through and ending solid friction. Incidentally, this second action may be present during starting, and absent during stopping, so that a bearing perhaps forms an oil film, in starting, at a lower value of speed times viscosity divided by load than that marking seizure in stopping. This second action is illustrated in Fig. 3, *A* and *B*. Before motion starts bearings and shaft will be in the relations to each other shown in *A*. When the shaft starts to rotate it will shift its contact point with the bearing, as in *B*, back against the direction of rotation. But this shift or attempt at it promptly pinches between shaft and bearing, at the new contact point, the oil film which was already present there. Only about 15 deg. of shaft rotation is needed to bring this action into play. (Tangent 15° = 0.27, which is greater than the usual coefficients of solid friction.) If, before the end of this first 15 deg. of motion, the acceleration has been high enough to get the speed above the minimum necessary to maintain the oil film, it is actually possible to get the shaft under way without experiencing any solid friction of the slipping, or abrasive, type. And in that case the starting friction will be fairly low. If the acceleration in starting is small, so that after 15 deg. of rotation the shaft velocity is still below the minimum necessary to maintain the film, then the shaft rolls for the first 15 deg. and then slips with solid friction until the speed goes high enough to carry the oil through. This latter is the usual case for plain bearings, certainly so when they start under heavy loads, and this high starting friction under load constitutes one of the disadvantages of a plain bearing when it is compared with ball or roller bearings.

When a cold machine comes up to speed the function (speed times viscosity divided by load) runs up to high values, for the viscosity is still very high. The oil film

then builds up to full thickness, as illustrated in the region *HI*, or beyond, in Fig. 2. This assumes, of course, an adequate supply of oil. Then the friction warms up the machine, as time goes on, and this lowers the viscosity of the oil. This lowering of viscosity results in a thinning of the oil film; the machine after warming up probably operates its bearings in the region *GH* of Fig. 2. If it gets into the region *FG* there is danger, with a slight further warming up, of breaking the oil film or having a bearing "seize."

A Remedy for Seizing

The remedy for seizing, since load and speed are fixed in the design and operation of the machine, is obviously the change of oil to one of higher viscosity. The low limit of tolerable viscosity for oil in a given machine is that viscosity which will give a fair factor of safety against seizing of the bearings when they are working at their worst combination of low speed and high load, and this viscosity must be had at the upper limit of bearing temperatures in the operation of the machine.

The action of a plain bearing when a machine is being shut down, and shaft speed comes down to zero, is in type very nearly the reverse of what happens in starting. The detail is different, mainly because the machine, and the oil in the bearings, are warmer than at starting. Viscosities are less, often considerably less, on account of the higher temperatures. The speeds at which the oil film breaks in shutting down are much higher than those at which the oil film forms in starting—very nearly, if not exactly, inversely as the viscosities. For in stopping as in starting there is a critical value of (speed times viscosity divided by load) below which the oil film cannot be maintained, and friction changes to mixed fluid and solid and slipping or rolling of solids. It is quite possible to determine experimentally this critical value of (speed times viscosity divided by load) which must be exceeded if lubrication is to occur in a given bearing.

There are two considerations to be kept in mind in placing oil holes and oil grooves in bearings. The first is that they do not belong in the loaded half. The second is that the oil supply should come in at the leading edge of the bearing, to be picked up by the shaft and carried up under the load with a minimum

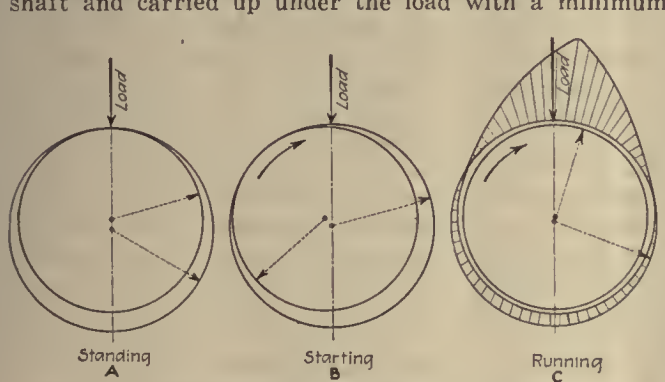


FIG. 3—EFFECTS FOR STANDING, STARTING AND RUNNING SHAFTS

of travel from the point of supply. This means practically that the best place for oil supply is about 90 deg. off the line of loading, and ahead of it. Trouble comes when the direction of loading is variable. In such a case we have to search for the point of minimum loading. One fact of importance in this connection is that a load due to centrifugal force, and hence rotating at shaft velocity with regard to the bearing, is indifferent as to location of oil supply from the bearing, and all such forces may be properly neglected in locating the oil holes and grooves, if these are in the bearing. The centrifugal forces cannot be neglected if the oil supply comes through the shaft. Grooves in the bearing should be of the simplest—a little channel from the oil hole,

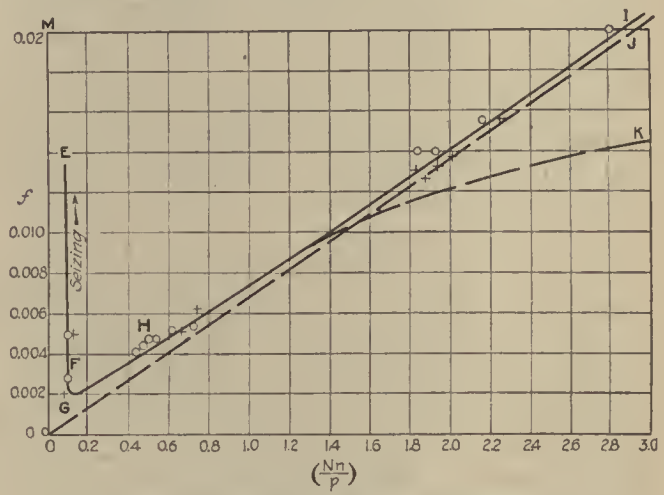


FIG. 4—CHARACTERISTIC CURVES OF RAILWAY TYPE BEARING IN THURSTON TESTING MACHINE

A characteristic curve of a railway type bearing in a Thurston testing machine is shown in Fig. 4. Shaft, steel, 3.97 in. diameter. Bearing, brass, 7.81 in. long, 3.31 in. chord of contact, 113 deg. arc of contact, bearing surface smooth, ungrooved cylinder; radial clearance about 0.003 in. Ordinate f is coefficient of friction; abscissa Nn/p is speed in r.p.m. x viscosity in C.G.S. units, over bearing pressure on projected surface in lb. per square inch. Two different oils were used, a machine oil and an automobile oil; the different point symbols indicate these oils. Three loads were used, 39, 135, and 155 lb./in.^{2} Three speed regions were used, 390, 230, and at seizing from 15 to 50 r.p.m. Viscosities ranged from 0.50 to 0.15 C.G.S. units. These load speeds and viscosities were combined in various ways to give a wide range of Nn/p. No matter what the combination used, a point on the curve *EFGHI* results. This shows that the experimental problem of measuring the action of oil in a bearing is fairly solved.

running out parallel to the axis of the shaft so that the length of the groove is about three-fourths of the length of the bearing. The groove should be quite a bit wider at the center of the bearing than toward the ends. The edges of the groove should be carefully and widely rounded off; they should never be sharp. A groove is made to spread oil, but it should not be forgotten that the natural end leakage of a bearing is an effective spreader of oil—perhaps even too effective, so that the groove need not do much in that line. A groove is also a reservoir of oil, to take care of starting conditions, and of intermittent character of oil supply in some systems of lubrication. Above all, grooves should never be put in the most loaded half of a bearing.

The advantage of ball or roller bearings over plain bearings are three. The starting friction of ball or roller bearings is the same as their running friction; starting friction of plain bearings is much higher than running friction, if the bearing starts under load. A plain bearing starting without load works about as easily in starting as a roller bearing. Second, the running coefficient of friction averages lower for ball and roller bearings than for plain bearings. The minimum coefficient for a plain bearing may be as low as the best of the ball bearing, but the minimum coefficient for the plain bearing comes just at the edge of seizing. Third, ball and roller bearings hold a shaft to rigid and exact concentricity. Plain bearings will do this only when operated at high speeds and light loads, and on small clearances. There is usually no necessity for concentric running of shaft and bearing; occasionally,

as in a lathe headstock, it must be assured. The disadvantage of the ball and roller bearings, as compared with plain bearings, is in initial cost and cost of installation.

Ball and roller bearings do not need lubrication to reduce their coefficient of friction, except as friction comes from rubbing of balls on each other, or on the retaining cages, or of the cages on the races. Indeed, lubrication frequently raises the coefficient instead of lowering it. The main reason for "lubrication," in ball and roller bearings, is to protect from rusting. Rust protection by the "lubricant coating the metals is quite another property from those concerned in real lubrication, though we must admit that no lubricant could be used as a lubricant anywhere if it did not have protective powers against rust.

A second case of lubrication is that of a wristpin in a steam or gas engine, or spring shackle bolt of an automobile. The line of loading is only slightly variable in direction; the loading may or may not reverse. The angular motion is small and is not continuous, but oscillating. In this case the angular motion will not carry oil in to form a lubricating film, as when the angular motion is continuous, and lubrication by oil is possible only when the loading reverses regularly. At each reversal oil runs in by combination of pressure squeezing and capillary action to the unloaded side of the pin, while being pushed out on the loaded side. The capillary action helps always to form or maintain the film. Another action of importance here is the increase of viscosity under pressure. This makes the oil squeeze out more slowly on the loaded side of the pin than it squeezes in on the unloaded side. If the pressure on a wristpin does not reverse, however, the oil will squeeze out on the loaded side and stay out. The pin may of course roll in its bushing for nearly 15 deg. of motion on either side of its central position before metallic slipping and wear need occur. Between this rolling action and the peculiar properties of grease lubrication a fair lubrication of wristpins or shackle bolts may often be had when the loads do not reverse.

Chief Function of Cutting Lubricants Is to Carry Off Heat

What may be considered another type of lubricating action occurs in the case of our "cutting oils" or solutions applied to cutting tools in the machine shop. Kingsbury has given the explanation of this case. The action of the "lubricant" is in part merely the carrying away of heat, keeping the cutting point of the tool from becoming overheated and losing its temper. With this cooling goes real lubrication, preventing still higher frictions. A little crack forms in the work being cut, just ahead of the cutting "point" of the cutting tool. This crack fills with lubricant by the capillary action, or surface tension effect. Temperatures being high, the surface tension of the lubricant is very low, and it will fill the little crack very rapidly indeed, unless the (bulk) viscosity of the lubricant is too high. To this rapid filling of the crack high viscosity is a detriment. The chip being cut off bends outward and slides across the top of the cutting tool, tending to a metallic contact with high pressure at a point a little bit back from the cutting end of the tool. It is at this point of contact of chip and tool that lubrication is needed. The lubrication depends upon the "body" or "oiliness" of the lubricant; in other words, the viscosity should be high when the lubricating film becomes very thin and subjected to high pressure. The previous requirement must not be forgotten that the bulk viscosity must be low, to permit the lubricant to run into place.

So far it has been tacitly assumed that the lubricant used was a liquid, possessed of a true viscosity, which viscosity was a function of temperature, pressure and film thickness. There is a large class of lubricants which are not liquids. These lubricants are called greases. Some greases are really or practically oils which have a freezing point above ordinary room temperature; put into a bearing they melt and act as oils after melting. Such melting down can be used to regulate the feeding of a grease into a bearing, though perhaps at the cost of a continuously high friction in the bearing. Greases, like the mineral oils, do not freeze completely from liquid to solid at one single temperature; they change from all liquid to a mix of liquid and solid, getting stiffer as it cools, through a wide range of temperature. In this condition of mixed solid and liquid, or colloid and liquid in soap greases, the grease is not properly called a viscous substance. It is strictly a plastic body, instead of a viscous one. The difference is this, that with a viscous body the application of any shearing force, however small, will cause a shearing motion proportional in velocity to the force, while with a plastic body the shearing force must exceed a certain finite value before any shearing motion occurs. This limiting stress to start shearing motion we may call the yield stress. When the shear stressing exceeds the yield stress, the velocity of shearing motion is proportional in a plastic body to the excess of the stress over the yield stress. Grease lubrication works at low speeds and high loads, where no oil will lubricate, and in trying to prove or disprove the theory we will make our first real measurement of those physical properties of grease which are active in lubrication.

Another consequence of the difference of viscous and plastic action occurs after motion has ceased. If load stays on after motion stops, or if metal surfaces are brought together in a direction normal to the surfaces, an oil will squeeze out from between the metals. It goes out rapidly at first, more slowly toward the end; but will in time squeeze out entirely. The squeezing out is slowed up, near its end, by the increase of viscosity under high pressures and in thin films, or "body" of the oil as distinguished from bulk viscosity. If now a grease be used instead of an oil we get the added effect of dependence of effective viscosity on rate of shear. This makes it much harder to squeeze the lubricant out from between the metals; it goes more slowly than an oil. And in the end it is probable that the greasy lubricant cannot be squeezed entirely out by a normal pressure. This may be the explanation of the superiority of greases over oils as lubricants in such places as steering spindles and spring shackle bolts of automobiles, or in plain collar thrust bearings. That property we call "greasiness," vaguely and without definition, may be the "yield stress" and "plasticity" of the grease, and the consequent dependence of effective viscosity on rate of shear.

Conclusion

We may now summarize the physical properties of lubricants in which we are interested. First is viscosity, necessary to the formation and maintenance of the lubricating film. We need the viscosity to get down to, but not go below, a certain minimum value at the highest temperature at which the lubricant must function. A

lower viscosity than this minimum will allow seizing of bearings while running; a higher viscosity is safe and tolerable, but brings higher friction in the bearings. If the lubricant must operate over a wide range of speeds, loads and temperature a high value of "body" will be desirable and helpful; that is, viscosity will increase distinctly under high pressures and in thin films. Viscosity and body need to be known as functions of temperature, so that we can foretell the action of the lubricant through the range of its temperature in service. With a grease the effective viscosity, or yield stress and plasticity, needs similarly to be known over the range of temperature, pressure and film thickness.

The measurement of surface tension of the lubricant, relative to the metals of shaft and bearings, is not usually important and probably would be difficult.

Where gravity flow, or flow through pipes under a small driving head, is used to supply lubricant to a bearing, we must be careful that at low temperatures the true or effective bulk viscosity of the lubricant does not get so high as to diminish or stop the supply. Hence an interest in the "chill point," or "cold test" of an oil (or "freezing point" of a grease?). The "chill point" test should not be done as it is now done; it should be a part of the test of viscosity as a function of temperature. The "chill point" should be taken as that temperature at which the bulk viscosity passes through a certain arbitrarily set standard viscosity; values of 10 or 20 c.g.s. absolute units are suggested.

We cannot tolerate in a lubricant any tendency to start rusting or corrosion of metals. The lubricant must be chemically neutral; not an electrolyte of becoming one to any appreciable degree. We ought to be able to use a film of a lubricant as a protection against rust.

The ideal lubricant should be permanent in its properties under the conditions of use. It should not change by oxidation, whether cold or hot, within the temperature range of service. It should not react with water either. A slight amount of evaporation of lubricant in service might be quite tolerable, if the remaining lubricant were still unchanged in properties, or not changed for the worse. Evaporation losses, as a source of oil consumption, are usually less than mechanical leakages from bearings or oiling systems. It is toward this question of permanence of properties in service that our tests of flash and burning point, carbon residues, oxidation products, etc., are directed. It may be suggested here that while the flash points and burn points of gasolines and kerosenes represent the formation of combustible mixes of the vapor of the oil with air, the case is different with lubricating oils. Uusually with lubricating oils the vapor of the oil does not make a combustible mix with air at atmospheric pressure; the combustible mix found at the flash point and above is due to decomposition products of oxidation and heating of the oil. And the temperature at which this first occurs (the flash point) is usually less important in itself than the nature and rate of the decomposition indicated and the effect of it on the residual oil. We need a new set of tests for our oils, for the effects on properties of the oil of oxidation, heat, and contact with water in reality, the tests for permanence of properties under conditions of service. These tests should cover emulsification also.

The picking up in suspension in the lubricant of dirt and metal dust cannot be blamed on the lubricant, and such stuff can be settled or filtered out in a properly designed lubricating system.

Progress Toward a National Public Works Department

THE movement to have Congress establish a national department of public works, to assume jurisdiction over all government engineering and construction undertakings, is progressing slowly but surely, according to a recent bulletin of the National Public Works Department Association, issued by M. O. Leighton, chairman. The first phase of the campaign, which is the establishment of the underlying principle, has been decisively won. The second phase, which consists of securing the right kind of a department, is to be more laborious than the first and involves much consideration of detail, sifting of evidence and presentation of results in convincing form.

The most distinct setback was the failure of the referendum of the Chamber of Commerce of the United States. The association attributes this failure to a lack of adequate publicity and to the inaction of local engineering bodies which were depended upon to take care of the issue in their own local commercial organizations. Lack of finance prevented the necessary publicity and evidence is being accumulated that important commercial bodies which voted adversely on the referendum did so in ignorance of its character, intent and purpose.

The association argues that the principles underlying the public works movement—economy and efficiency in business and conduct of the government affairs—are not confined to the public works function. It has been remarked that if a public works department is created, this will be the first step in applying businesslike principles to the entire government structure.

Delay is sometimes urged pending the announcement of a general bill for the reorganization of the government, but this seems rather useless, the logical step being to establish the public works department first.

The association points out that engineers, architects and technical men throughout the country have a rare opportunity to further the movement now because Congress is in recess and representatives are at home. It is up to the men "back home" who will ultimately benefit by the establishment of such a department to instruct their representatives in Congress and enlist their cooperation in the furtherance of this legislation.

Appeal for Equitable Laws

THE Hon. Joseph M. Brown, who has served two terms as Governor of Georgia, has written an interesting pamphlet entitled "An Appeal for Just Laws and for Their Impartial Enforcement." Ex-Governor Brown has sent this pamphlet to all the national legislators and hopes to get action on his recommendations.

The pamphlet is of interest to the railway industry as it purports to be a history of the street railway strikes and the action of the Amalgamated Association of Street and Electric Railway Employees of America in connection therewith. The pamphlet gives data in regard to seventy-nine strikes in sixty-five cities due to the Amalgamated Association, with information on the damages and injuries incidental to these strikes. In order to eliminate such damages and injuries Ex-Governor Brown urges a law that will force unions to incorporate and thus render them liable to civil action, just as the railways are liable to civil action in damage suits.

Record of Large Turbo-Generator Armature Breakdowns*

Temperatures Up to 150 Deg. Not Injurious—Local Heating Only Cause of Breakdown—High Voltage Generators a Success

BY F. D. NEWBURY
Manager Power Engineering Department
Westinghouse Electric & Manufacturing Company

THE first Westinghouse generators larger than 10,000 kva. were placed in operation in 1913. These were generators roughly 20,000 kva. in size, two pole in the case of 25 cycles and four pole in the case of 60 cycles. The design of such large two and four-pole units in 1911 and 1912 was highly experimental, and while these units met the standard temperature rise guarantee of 50 deg. C. by thermometer it has since been found that the true copper temperatures of the strands nearest the air gap near the center of the core have had at least 200 deg. C. rise in some cases. Experience has shown designers how to avoid these high local temperatures to a considerable degree (mainly by reduction of eddy current losses), and this is mentioned here only to bring out the significance of the record of trouble due to heating.

During these seven years' experience there have been twenty-two cases of major armature trouble, involving twelve different installations or designs and sixteen individual units. By major armature trouble is meant trouble serious enough to result in the failure of one or more armature coils.

The classification of armature failures as to cause is in some cases a difficult matter. The events leading up to the trouble may be unknown and the evidence is very often burnt up. It has been thought best, therefore, to separate these cases into three classes, as follows:

1. Where the manufacturer has accepted responsibility.
2. Where the operating company has accepted responsibility.
3. Where the cause is unknown or in dispute.

1. Eight cases were chargeable to design, workmanship or other causes for which the manufacturer accepted responsibility. Five cases (of these eight) were caused by defects in manufacture that developed very shortly after installation. Three cases (of these eight) concerned details of design that led to failure after four or five years' operation. Two of these cases (in one design) involved high local temperatures caused by eddy currents in the top strands of the coil.

2. Eleven cases were chargeable to operating hazards for which the operating company accepted the responsibility. Four cases (of these eleven) were caused by trouble first originating outside of the armature winding. In three of these cases the fire started in the cable just outside of the generator; in the fourth case the fire started in a series transformer accidentally open circuited. Four cases (of these eleven) occurred in one installation and were caused by abnormal voltage surges that caused the outside surfaces of the insulation to catch fire. In addition to these four cases that resulted in coil failures as many more fires started that were put out before such damage was done. This trouble disappeared after the generator neutral was grounded. One case (of these eleven) was caused by ice or water (it occurred on Feb. 28) carried into the generator from the air washer. Two cases (of these eleven) were caused by forced operation under conditions that were known to be unsafe. One case involved unsafe overloads and the other case involved continued operation after it was known that the armature needed minor repairs.

3. Three cases involved unknown causes or the cause was in dispute. In two of these cases the operating company believed armature coil heating to be responsible.

This classification of armature breakdowns shows that out of nineteen cases where causes were agreed to eleven cases were caused by operating hazards for which the generator can in no way be held accountable. The majority of these cases were caused by fires of external origin.

If all the cases in which armature heating was involved, even by suspicion, are grouped there are only five cases out of twenty-two breakdowns. Two cases, involving one of the first designs, were caused by design proportions; in two others temperature was not the primary cause of breakdown, but the operating companies believed it to be a contributory cause, and in the fifth case enforced overloading was the primary cause.

The writer's opinion, based on a careful study of operating experience and based on a detailed knowledge of internal temperatures and coil and insulation design, is that breakdowns caused by armature heating are in reality due to abnormal local temperatures that have values of the order of several hundred degrees, and that temperatures of 100 deg. or 150 deg., ordinarily discussed in connection with guarantees, have very little to do with the problem. This statement, of course, applies only to windings completely insulated with mica within the slots.

HIGH-VOLTAGE GENERATORS SUCCESSFUL

This record of breakdowns brings to the surface another fact that is interesting and important and that is reassuring to the companies operating high-voltage units. If these generators be classified according to voltage it is found there are twice as many generators wound for 11,000 volts, or higher voltage, as there are generators wound for lower voltages. But these twenty-two cases of armature breakdown are equally divided between these two voltage classes. This means that the percentage of armature breakdowns in the high-voltage generators under discussion is only one-half that of the lower voltage generators. This record would be very different with treated cloth insulation (in large high-voltage generators) that is subject to cumulative heating on account of dielectric losses increasing with temperature, or with partially closed armature slots, still used by some European designers.

This record does not prove that high-voltage generators are necessarily safer or less subject to breakdown, except in so far as breakdowns may be caused by voltage surges that are independent of generator voltage. Obviously a 10,000-volt surge would be dangerous in a 2,400-volt generator, but would be harmless in a 13,000-volt winding. The record does prove that 11,000 and 13,000-volt windings are just as reliable as low-voltage windings, and, further, that breakdowns are generally caused by trouble unrelated to line voltage.

The facts brought out by this record may be summarized as follows:

1. The majority of armature breakdowns is caused by operating hazard originating outside the generator.
2. Armature heating in armatures completely insulated with mica is a minor cause of breakdown.
3. High-voltage generators, with mica insulation and open armature slots, are as reliable as, and probably are more reliable than, large low-voltage generators.

*NOTE BY AUTHOR.—This article is based on a discussion of a paper, "Classification of Large Steam Turbo-Generator Failures," by Philip Torchio, presented at the A.I.E.E. convention, White Sulphur Springs, June 30, 1920.

Going After Business at the Depot*

Several Definite Suggestions Are Made as to How Street Railway Companies Can Get a Larger Part of the Traffic Originating at the Railroad Station—Experience of a Traveling Man Points Way to Greater Use of Signs, a Barker and a Waiting Car

By W. McK. WHITE
Western Manager Columbia Machine Works & Malleable Iron Company

EVERY day taxicabs and buses haul loads of people to and from the railroad stations at high rates of fare, when the majority of travelers would much prefer to use the street cars if the service were available and, which is just as important, if it were persistently brought to their notice. How can this business be drawn to the street railway company? The simple expedient of increasing the number of cars on the station routes or of rerouting to have a station-to-hotel circuit or an all-depot belt line is valuable and essential, but there are other steps necessary to assure a paying traffic for these cars. Or perhaps it would be well to say that other means should be used to give you the cream of this business, namely, fully loaded cars and a pleased patronage rather than a casual traffic picked up at random.

In dealing with the incoming passenger business at the depot there are three phases of the situation to consider.

First, there are those people who are familiar with the town they are entering. They know whether they can reach their destinations conveniently by trolley and what car to take. They know what the prevailing rate of fare was when they left town and they know how long they will be enroute. This traffic is fostered by the customary methods and frequency of service, and if these passengers prefer to pay a high taxi fare it is at their own volition, unless the car service for them is actually inconvenient. But the majority will use street cars if an adequate schedule is offered.

Second, there are those people who are strangers and prefer to take a cab or bus, rather than to be recognized as strangers by having to ask a policeman or station porter or some one else for directions. It may seem peculiar to have this distinction made, but I am sure you will agree that the average traveling man does not like to stand around asking how to reach his hotel. So he jumps into a cab and pays seven to ten times more than street car fare to reach his destination, and the few minutes that he saves thereby are ordinarily not worth it.

Third, there are many travelers who take cabs from force of habit, a habit acquired perhaps when they were strangers and never learned that a convenient street car service was being maintained. Of course many persons take individual means of transportation because they can well afford it and it is their desire. And many, it is to be regretted, do so because of previous experience with long waits forced by non-appearance of trolley cars. I am thinking, however, of thousands of travelers of moderate means and reasonable minds who would prefer to pay 5, 6 or 7 cents for a trolley trip to their hotels or homes, instead of a flat 50 cents or a taxi rate of 50 cents at least and usually more.

*Abstract of paper presented at the Illinois Electric Railway Association, midsummer meeting, Springfield, Ill., July 30.

Nearly every street car system operates lines reaching the railroad stations and hotels, and in fact every possible source of revenue passengers. Quite often it costs more to gather up a few fares than the amount taken in. But if, in so doing, the habit of street car usage is fostered and the dependence on cabs is reduced the effort is worth while. The problem then is not to originate revenue traffic but to corral that which is available and which to the railways at present is lost. I am offering some suggestions which would cost little to put into effect and are entirely feasible.

A railroad station crowd usually needs only to be politely directed. But when the people emerge from a station they are greeted by cries of "Taxi, taxi!" "Cab, cab!" "Buses to hotels," and similar invitations. Now why not surprise them by letting them hear "Street car to all hotels," "Street car down town," "Street car to all points. This way, please."

Or at least why not post a prominent sign which might read "Street car leaves this station every four minutes for hotels and all parts of the city. Fare, 6 cents." Or, perhaps this: "Street cars leave this point every six minutes. Frequent, safe service to business and residence parts of the city. Fare, 7 cents."

I think that electric railways do not make sufficient use of signs to direct passengers. We know of signs which have been of great value, such as those which the Chicago Elevated Railways have painted on their structures. Tens of thousands of persons every day follow the painted arrows in the New York subway stations. The skip-stop and the later plan of loading berths have led to the use of "Car-stop" signs, but we need more signs of an informative nature and the wider use of them should be considered by all railway managers. A splendid start could be made at the steam railway stations and then on trolley poles opposite the hotel entrances. Don't you think it would please a great many travelers to see a sign across from their hotels reading "Street car to Union Depot, every five minutes. Fare 7 cents."

A sign tells its story all day long and may easily be illuminated for night display.

Study the Load at the Station

In almost every city there are certain hours when a large number of people arrive at the stations on important trains. I believe the street car companies would do well to have a man "on the spot." Every company employs a number of uniformed street men, inspectors, supervisors and others who could be used. There should be no logical objection to the active solicitation of business which daily escapes because of passive methods. A special gathering in some locality at infrequent periods will receive the particular attention of the transportation department and yet daily hundreds of

possible fares pass through the railroad station gates unnoticed. The street car companies can invite this patronage as surely as and more properly than the taxicab drivers.

It may not be necessary to assign a representative to this work exclusively at any one station unless the business warrants it. But that inspector in his daily wanderings might just as well as not be at the Union Station when the morning trains come in, or at the Central Station when the afternoon Limited arrives. And he would become a business-getter for the company.

Coincident with this it would be wise for the traffic departments to make a closer study of the time of train arrivals and of average loads. Most street railway companies endeavor to provide a good station service, but suppose you are running a ten or twelve minute headway in the middle of the day and your car leaves the station at 11.10 a.m. when a train is due at 11.13. Or perhaps the 3.36 p.m. car meets a train on which records show a heavy passenger traffic arriving. Here is a chance for a beneficial change in the street car schedule, because trains often arrive on time, and the non-appearance of a car for even five minutes will greatly increase taxicab patronage. I feel sure that the cases mentioned are entirely possible and are occurring in many places.

The safety car has given us the slogan "A car always in sight," and this thought is justly popular in street car offices today. Now why not apply this effectively to the depot car line? A sign is good, a uniformed announcer is better, but best of all would be a waiting car. All the cries of taxicab drivers would avail little against the presence of a street car and it would draw the crowd as positively as a magnet acts on iron filings.

I think the constant presence of a street car is entirely feasible. If the line passing the station is a busy one, with a headway of a minute or two, or even less, there would always be a car in sight, down the street perhaps. Why not hold each car until the next one arrives, using this as a point for checking car movements and schedules and at the same time secure the advantage of always having a car at the station. And if the station is on a single line with a longer headway, why not have your lay-over there instead of at some unimportant place at the far end of town. A station lay-over point would offer conveniences for your crews, and I would again suggest that each car await the arrival of the next following one before departing.

Recently I was discussing this subject in New Orleans with Nelson H. Brown, general superintendent of railways, and he told me of an experience he had in Worcester, Mass., several years ago. He put on a depot car, the only duty of which was to meet incoming trains and its crew had no specific route. The conductor would ask passengers where they wished to go and he would route the car to suit the convenience of the greatest number. This car proved to be the best paying one in Worcester. Many other schemes can be evolved to attract the station trade and to facilitate handling it. If the traffic is heavy enough a hotel-station line may be installed as in Cleveland and Kansas City.

It is not often that you find a situation like that in Peoria, where the street car company has a terminus within the steam railroad station, but this might be arranged elsewhere. The collection of fares by a street man as well as by the conductor, the increase of car service and other suggestions are in order. And I hope that your carpenter shops will be instructed to turn out some good signs, your painter to letter them (black on a cream background is a good combination) and your line department to mount them on poles at stations and hotels.

Polite Crews Help

In conclusion, I am going to offer a suggestion concerning the platform men on the depot cars. These cars should be manned by crews who can politely and intelligently handle strangers, who know the city, are willing to answer questions and to call the names of streets and hotels. They should be coached on the value of this business and urged to co-operate. They should be instructed not to pull away just when a train arrives, for nothing is more aggravating to those coming through a station than to see a car just departing when so many more passengers could be carried. The trouble is that the average crew considers the schedule more important than public service and the filling of the fare box. Where a delay of two or even three minutes would fill a car with pleased passengers it is worth while to wait.

We have all heard exclamations like these: "Gee, we were lucky to catch a car right away," "Thanks for waiting," "This is fine." Isn't that far better in the pyschology of public relations than "Oh, pshaw! Why didn't they wait," or "Just my luck to miss that car." Or, what is far worse, "Well, I guess we'd better take a taxi."

"Facts About Figures"

AN EXPERT on publicity whose name is known from coast to coast writes as follows on the editorial on "Facts About Figures—Figures About Facts," in the issue of this paper for June 26:

You have hit the keynote about "facts and figures" exactly. Figures are the most tiresome and uninteresting, as well as unconvincing, things in the world except to the "bug" who dotes on that sort of stuff, but for the average normal mind we have got to prepare the figures according to a different formula, and your formula is the right one.

Many a time I have thanked the Lord for the broad vision of the executive officers of the company with which I am connected for accepting this view of the situation and that is why I never attempt in my work to run a mass of unvarnished statistics. The lay mind will not react on figures or technical statistical matter. You have got to speak in the language of the street or the street car when you try to present statistical matter.

Think of the world of time, energy and gray matter utterly wasted by our high-priced efficiency experts, traffic sharks, accountants, engineers and others in preparing a maze of figures that prove nothing to the untutored, non-technical mind.

Now, I want to congratulate you for the concise and clear way you have stated the proposition. It is "facts about figures" and not "figures about facts" that drive your argument home, and the fewer figures the better.

I hope every publicity man and every executive and every figure expert in our industry read that editorial and took it to himself as a personal message.

New Side Bearing Trolley Wheel

THE Thornton Trolley Wheel Company, Ashland, Ky., is placing on the market a new type of construction for trolley wheels. No bushing or central axle is used, but instead two spherical side bearings with removable bearing bosses. The bearing bracket is provided with two grease reservoirs, so that the wearing parts are lubricated with grease. It is claimed that the two reservoirs will provide sufficient lubrication when filled to operate approximately 1,000 miles under normal service conditions.

St. Paul Electrification Results*

Complete Results of Electrical Operation for the Year 1919—Effect of the New Power Indicator and Limiting System—Itemization of Costs

BY R. BEEUWKES
Engineer Chicago, Milwaukee & St. Paul Railway

POWER for the electrical operation of the Chicago, Milwaukee & St. Paul Railway between Harlowton, Mont., and Avery, Idaho, is delivered to the transmission system in the form of 100,000-volt, three-phase, 60-cycle current. The power is supplied under two separate contracts, one for the Rocky Mountain division, extending from Harlowton to Deer Lodge, and the other for the Missoula division, extending from Deer Lodge to Avery.

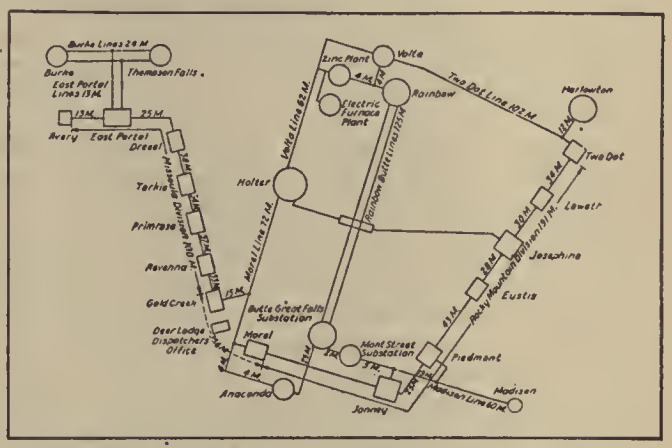
The power company's 100,000-volt transmission lines are shown in the single line layout of the system, as are also the points of power delivery to the railway company and the latter's 100,000-volt transmission system.

TABLE I—ST. PAUL ELECTRIFICATION—LIST OF SUBSTATIONS AND THEIR EQUIPMENT

Substations	Transformers	Motor Generators
Rocky Mountain Division		
Two Dot	Two 2,500 kva.	Two 2,000 kw.
Loweth	Two 2,500 kva.	Two 2,000 kw.
Josephine	Two 2,500 kva.	Two 2,000 kw.
Eustis	Two 2,500 kva.	Two 2,000 kw.
Piedmont	Three 1,900 kva.	Three 1,500 kw.
Janney	Three 1,900 kva.	Three 1,500 kw.
Morel	Two 2,500 kva.	Two 2,000 kw.
Missoula Division		
Gold Creek	Two 2,500 kva.	Two 2,000 kw.
Ravenna	Two 2,500 kva.	Two 2,000 kw.
Primrose	Two 2,500 kva.	Two 2,000 kw.
Tarkio	Two 2,500 kva.	Two 2,000 kw.
Drexel	Two 2,500 kva.	Two 2,000 kw.
East Portal	Three 2,500 kva.	Three 2,000 kw.
Avery	Three 1,900 kva.	Three 1,500 kw.

The railway transmission line of the Rocky Mountain division extends from Two Dot substation to the Morel substation, a distance of 184 miles, the former point being 12 miles from Harlowton, eastern terminus of the division, and the latter point 17 miles from Deer Lodge, the western terminus. Power is delivered by the power company at the Two Dot, Josephine, Piedmont and Morel substations. The railway transmission line of the Missoula division extends from Gold Creek substation,

*Abstract of paper presented before the Pacific Coast Section of the American Institute of Electrical Engineers, Portland, Ore., July 15, 1920.



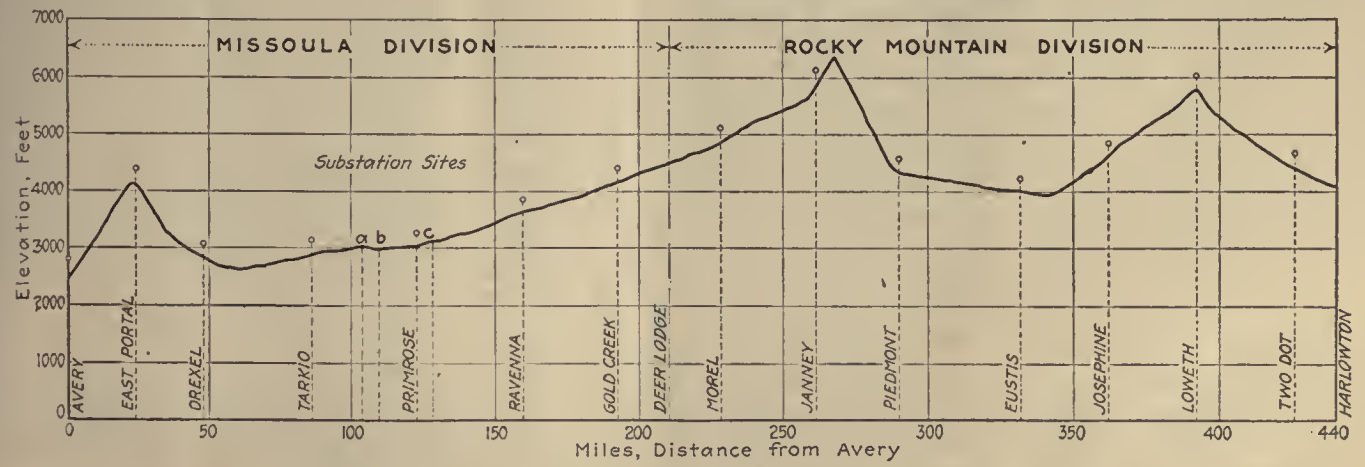
TRANSMISSION LINE AND SUBSTATION LAYOUT FOR THE CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION

18½ miles from Deer Lodge, a distance of 180 miles, to the substation at Avery, the western terminus of the division.

Seven substations on each division are used to convert the 100,000-volt alternating current of the transmission line to the 3,000-volt direct current used for traction purposes. Each motor generator consists of two 1,500-volt direct current generators connected in series and driven by a 2,300-volt synchronous motor supplied from the substation high tension buses through a three-phase, 100,000/23,000-volt transformer and is guaranteed for a maximum five-minute overload of 200 per cent. The rated capacities of these stations are given in Table I.

The accompanying diagram shows diagrammatically the railway company's high-tension line, arrangement of apparatus in the substations and the general layout of the 3,000-volt distribution or trolley system.

The contact wires of the trolley system consist for the main line of two No. 0000 B. & S. grooved trolley wire flexibly supported side by side from a ½-in. steel catenary and tapped at intervals of about every 1,000 ft.



PROFILE OF THE ELECTRIFIED DIVISIONS, SHOWING SUBSTATIONS

to a feeder which connects to the adjacent substation buses through switches and automatic circuit breakers. Over passing, industrial and similar tracks only a single No. 0000 copper trolley wire is used. There is an insulated air gap in the trolley in front of each substation separating the trolley system west of the substation from that east of the substation; that is, portions east and west of the substations are fed, respectively, through separate feeder breakers. There is also an insulated air gap at the beginning and end of every passing track, so that by means of a section switch installed in the feeder at the gap the district between any two gaps may be isolated in case of trouble so as to permit operation up to the location of the open switches.

The return circuit consists of the 90-lb. running rails and, in general, of a No. 0000 B. & S. copper supplementary negative wire which is run along the trolley poles and connected to the track at intervals averaging about 8,000 ft. through each alternate signal system reactance bond. This supplementary negative, however, is intended more as a safety measure to bridge open rail bonds than to increase the return circuit conductivity. However, on various feeder cutoffs on the mountain grades, where the conductivity of the positive circuit closely approaches that of the return circuit, one of the two feeders on the cutoff is in parallel with the running rails and is provided for the purpose of increasing the return circuit conductivity.

Power Demand Controlled by Train Dispatcher

The terms of the power contracts are similar and each provides for a minimum payment on basis of a 60 per cent load factor. Where the load factor exceeds 60 per cent payment is made on basis of the actual kilowatt-hours consumed, the rate being 5.36 mills per kilowatt-hour. The demand is controlled for each division by means of a so-called power indicating and limiting system,* which on the Rocky Mountain division was put into operation early in the year 1918 and on the Missoula division a few months ago. Briefly, this system is so arranged as to indicate and record at the dispatcher's office at Deer Lodge the total kilowatts or demand being supplied in any instant by the power company to the railway company and to prevent the maximum demand from exceeding a certain amount as determined by the "demand setting made by the dispatcher," this limiting action being secured by lowering of the substation direct-current voltage and therefore of the train speeds.

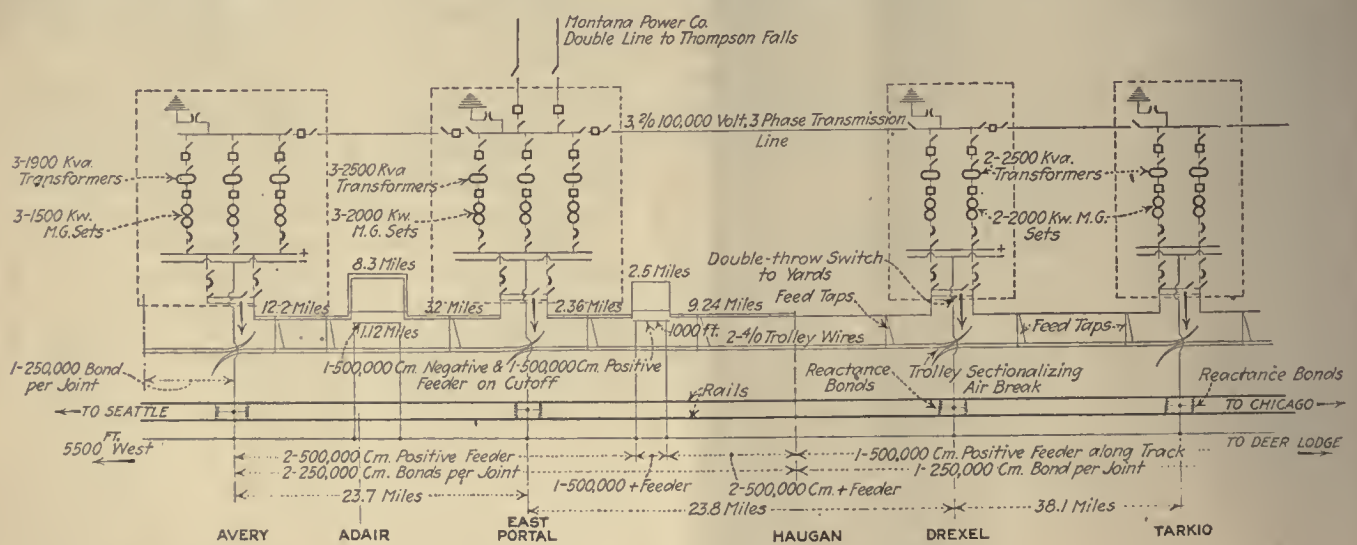
The effect of this limiting action is clearly indicated on the graphic time-table of train movements on the Rocky Mountain division for February 19, 1920, and corresponding load curve traced by tapalog meter of the power indicating and limiting system with the load limit set at 16,000 kw.

The percentage of time when the limiting action will take place, for a given amount of business, will depend on the demand setting and on the possibilities of spacing the trains so that as few as possible will at one time be operating on the heavier grades, the latter matter, except as regards passenger trains and certain time freights, being to a considerable extent in the hands of the train dispatchers. The slowing up of the train speeds of course results in increased train and enginemen's expense and increased time in getting freight over the road, and a proper balance must be struck between this increased expense and the saving in power cost and the limit setting determined upon accordingly. Table II gives an idea of the percentage of time the limiting action takes place with average kilowatt load and settings as indicated, this percentage being based

TABLE II—ST. PAUL ELECTRIFICATION, LIMIT SETTING AND AVERAGE KILOWATT-HOUR TAKEN MONTHLY

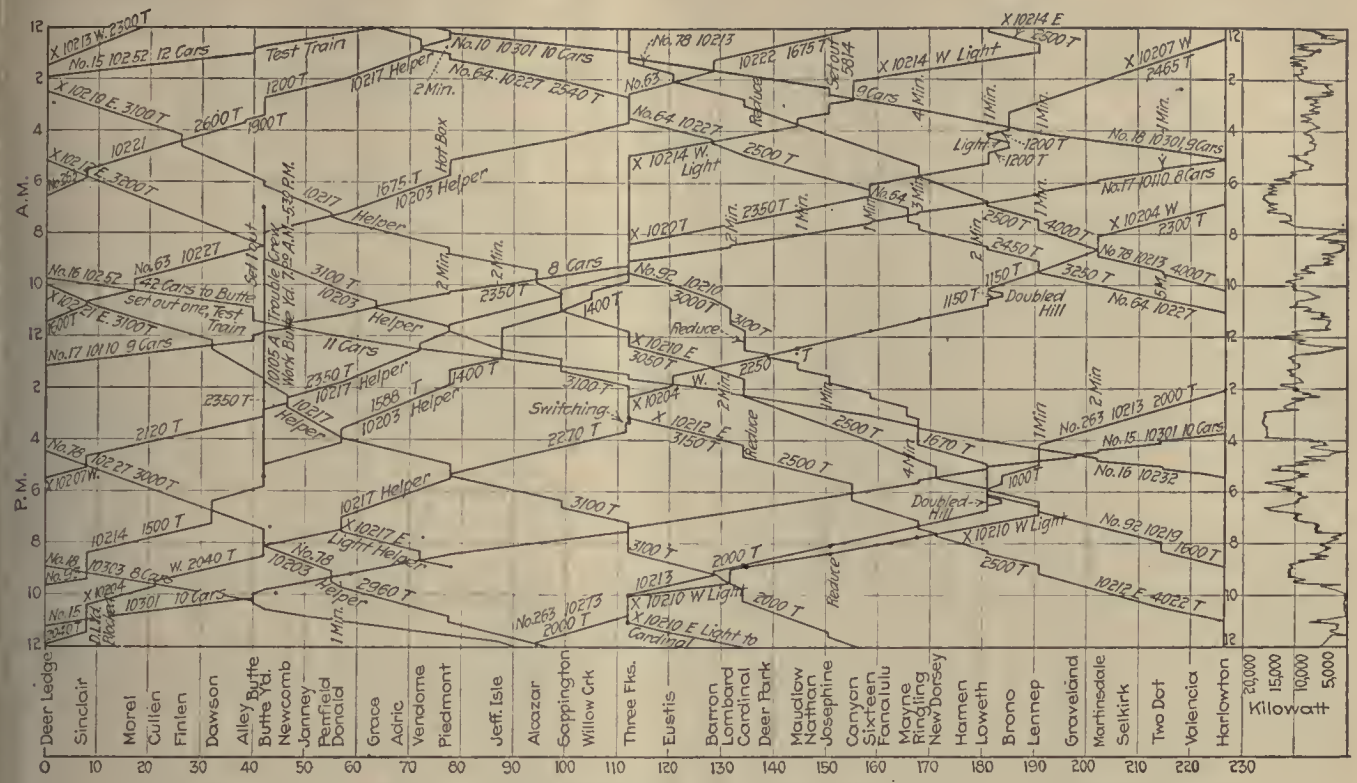
Month	Limit Setting	Average Monthly Load in Kilowatts	Per Cent Time Limiting Action Takes Place
July, 1918	12,000	8,020	13.0
Aug., 1918	12,000	7,820	15.5
Sept., 1918	12,000	6,675	8.2
May, 1919	14,000	7,840	4.62
Aug., 1919	14,000	7,650	4.12
Sept., 1919	14,000	8,230	9.50
Oct., 1919	14,000	8,420	10.65
Nov., 1919	14,000	7,115	8.24
Feb., 1920	16,000	8,625	2.40
Mar., 1920	16,000	8,680	2.20
April, 1920	16,000	8,620	.90

*This system was described in the ELECTRIC RAILWAY JOURNAL for April 10, 1920, page 759, in the article "Holding Down Line Peaks," by J. J. Linebaugh.



ELECTRICAL LAYOUT FOR A PART OF THE SYSTEM

NOTE.—Feeder and trolley are sectionalized at all substations and railway stations. No. 0000 feeder is tapped to each trolley every 1,000 feet. Reactance bonds are 5,000 to 6,000 ft. apart. Negative taps are made to the middle point of every second reactance bond. Side track rails are bonded in series with the supplementary negative. One rail bonded with one 250,000 circ.mil bond per joint in the yard. Trolley feed taps are disconnected for a distance of 1 mile on each side of each substation where there is a single feeder and 2 miles where there is a double feeder, except at Ravenna, where the tunnel entrance east, and at East Portal, where the tunnel entrance west, limit the distance. Other portions are similar to that above.



GRAPHIC TRAIN SHEET AND LOAD CURVE FOR THE ROCKY MOUNTAIN DIVISION, FEB. 19, 1920

on the number of hours the limiting system was actually in service.

In arriving at the amounts chargeable for power against the different classes of train service, the total kilowatt-hours to be paid for—that is, the actual kilowatt-hours, or the actual kilowatt-hours increased, if necessary, to correspond to a minimum 60 per cent load factor—are taken and from them are deducted the kilowatt-hours metered against substation lighting, auxiliary power, signal system supply, etc., amounting to about 1 per cent. The remaining kilowatt-hours are then divided between the different classes of train service, freight, passenger and non-revenue, in proportion to the total net kilowatt-hour readings obtained for these respective services from wattmeters installed in the locomotives. These readings are taken on the form provided for the purpose, and a record of the power consumption of each train is thus obtained. The readings are referred to as "net" readings, as they represent motored energy less regenerated energy.

TABLE IIIA—ST. PAUL ELECTRIFICATION—AVERAGE INPUT

	Rocky Mountain Division			— Missoula Division —		
Month	Actual Kw.-Hrs. System Input for Locomotives	Net Kw.-Hrs. Input at Locomotive	Ratio	Actual Kw.-Hrs. System Input for Locomotives	Net Kw.-Hrs. Input at Locomotives	Ratio
January..	6,381,233	4,838,480	75.9	5,540,581	3,753,430	67.6
February.	4,610,607	2,921,840	63.3	4,107,960	2,702,710	65.8
March...	5,795,859	4,351,126	75.2	5,412,048	3,469,120	64.2
April....	5,949,840	3,962,650	66.6	5,429,932	3,574,080	65.8
May.....	5,803,455	4,146,517	71.4	5,745,397	3,795,770	66.2
June....	5,662,650	4,100,810	72.3	5,697,785	3,853,590	67.6
July.....	5,744,738	3,794,940	66.2	5,318,692	3,505,630	65.8
August..	5,648,815	3,755,280	66.5	5,133,008	3,255,820	63.4
Sept....	5,892,430	3,799,830	64.5	5,102,562	3,434,010	67.3
October..	6,222,486	3,971,149	63.8	5,389,883	3,654,955	67.8
November	5,095,937	3,425,458	67.2	4,879,130	3,181,456	65.2
December	5,809,976	3,830,870	65.8	4,971,601	3,382,700	67.9
Total...	68,618,026	46,898,850	68 3	62,728,579	41,563,271	66.3

The ratio of the total net locomotive wattmeter readings, all services, to the total actual kilowatt-hours input to the system chargeable to locomotives for the various months of 1919 is given in Table IIIA.

As there are no wattmeters installed in the direct-current side of the substations, a ratio for net substation output to system input or to locomotive is not obtainable. There are, however, wattmeters in the circuits of the individual motor generator sets and Table III, considered in connection with the profile of the line, and Table IV, on page 230, will be of interest in showing the manner in which the energy is distributed among the respective substations, average kilowatt being used for convenience instead of total kilowatt-hours, and the whole of the year 1919 being taken.

TABLE III—ST. PAUL ELECTRIFICATION—AVERAGE INPUT OF SUBSTATIONS

	Rocky Mountain Division — Avg. Annual Kw. Input Net to Motor Generators			Missoula Division — Avg. Annual Kw. Input Net to Motor Generators	
Substation	*Total	**Per Motor Generator	Substation	*Total	**Per Motor Generator
Two Dot.....	895	813	Gold Creek.....	1,150	1,128
Loweth.....	962	783	Ravenna.....	915	1,115
Josephine.....	1,014	1,013	Primrose.....	908	925
Eustis.....	1,022	1,016	Tarkio.....	843	803
Piedmont.....	1,218	617	Drexel.....	790	778
Janney.....	1,390	559	East Portal.....	1,390	778
Morel.....	1,047	1,072	Avery.....	812	523
System total....	7,548	....	System total....	6,808	....

* Total kw.-hrs. Computed on the basis of 8,856 hours in the year; four days in December are included.
** Total kw.-hrs.: Total running hours of motor generators.

Operating Figures for 1919

The figures in Table V, on the next page, show for the year 1919 the net kilowatt-hours per thousand gross ton-miles for freight revenue service and passenger service, respectively, and corresponding cost of these kilowatt-hours at the high tension bus or point of delivery of the power to the railway system. The lesser

TABLE IV—ST. PAUL ELECTRIFICATION, LINE DATA

From	Elevation*	Curve in Degrees Maximum	Curve in Degrees Average	Grade Total	Grade Maximum	Grade Average	Distance Miles†
Avery to Kyle	2,495	10	4.62	1,706.3	1.70	1.35	7
Kyle to Falcon	2,996	10	4.01	1,051.8	1.70	1.48	5
Falcon to Adair	3,394	10	3.73	990.4	1.70	1.50	5
Adair to Roland	3,782	10	4.24	1,074 3	1.70	1.45	6
Roland to Tunnel No. 20	4,150	10	4.06	112.0	1.12	1.03	1
Tunnel No. 20 to East Portal	4,160	10	4.06	112.0	1.07	1.03	1
East Portal to Saltese	4,147	10	3.45	1,563.6	1.70	1.53	8
Saltese to Haugan	3,452	10	2.35	671.5	1.70	1.09	4
Haugan to Drexel	3,142	10	2.62	1,342.8	0.80	0.56	10
Drexel to Foraker	2,856	10	3.27	775.8	0.80	0.52	5
Foraker to St. Regis	2,733	10	2.25	583.0	0.60	0.21	5
St. Regis to Ashmore	2,678	5	0.85	280.9	0.40	0.12	6
Ashmore to Superior	2,674	3	0.73	230.6	0.40	0.14	7
Superior to Cobden	2,717	3.02	0.37	166.4	0.40	0.23	8
Cobden to Tarkio	2,823	5	0.94	388.7	0.40	0.25	8
Tarkio to Cyr	2,925	5	0.87	397.0	0.40	0.14	9
Cyr to Alberton	2,988	3	0.84	287.0	0.35	0.16	5
Alberton to A	3,042	3	1.20	165.0	0.35	0.28	3
A to B	3,078	3	1.29	401.8	0.40	0.21	2
B to Frenchtown	3,003	2.84	0.29	105.1	0.20	0.07	10
Frenchtown to Primrose	3,028	2	0.26	84.4	0.30	0.13	8
Primrose to C	3,071	0	0.00	0.0	0.40	0.36	5
C to Missoula	3,160	4	0.39	103.8	0.32	0.09	8
Missoula to Bonner Jct	3,182	10	1.42	474.7	0.40	0.28	6
Bonner Jct. to Clinton	3,279	3	0.29	152.0	0.40	0.33	10
Clinton to Ravenna	3,452	2	0.20	121.1	0.40	0.35	11
Ravenna to Bearmouth	3,665	3	0.84	454.6	0.40	0.26	10
Bearmouth to Drummond	3,805	4	0.64	350.7	0.40	0.27	10
Drummond to Gold Creek	3,955	2.5	0.15	96.0	0.40	0.37	13
Gold Creek to Garrison	4,188	3	0.8	325.1	0.40	0.34	7
Garrison to Deer Lodge	4,329	3	0.3	174.0	0.40	0.42	10
Deer Lodge to Sinclair	4,520	3	0.06	20.6	0.60	0.46	10
Sinclair to Morel	4,684	3	0.17	84.8	0.60	0.40	9
Morel to Finlen	4,882	3	0.95	441.3	0.60	0.57	8
Finlen to Dawson	5,145	10	1.58	5.33	0.60	0.44	6
Dawson to Colorado Jct	5,292	6	0.77	3.13	1.08	0.46	6
Colorado Jct. to Butte Yard	5,480	8	20.0	215.0	0.75	0.04	2
Butte Yard to Newcomb	5,484	5	0.44	109.1	0.90	0.54	5
Newcomb to Janney	5,618	8	2.9	853.8	1.66	1.03	4
Janney to Continental Divide	5,871	8	2.65	865.1	1.66	1.47	5
Continental Divide to Grace	6,352	8	2.81	1,052.2	2.00	1.84	8
Grace to Cedric	5,664	8	2.49	631.8	2.00	1.92	5
Cedric to Vendome	5,178	8	3.46	693.1	2.00	1.80	3
Vendome to Piedmont	4,818	1	0.06	19.0	2.00	1.58	7
Piedmont to Jefferson Island	4,359	1	0.11	56.9	0.30	0.19	10
Jefferson Island to Alcazar	4,263	8	2.18	773.2	0.26	0.09	6
Alcazar to Sappington	4,232	4	1.10	290.5	0.33	0.20	4
Sappington to Willow Creek	4,180	2	0.14	48.0	0.30	0.10	8
Willow Creek to Three Forks	4,145	1	0.02	8.4	0.40	0.25	6
Three Forks to Eustis	4,066	5	0.25	171.2	0.30	0.18	8
Eustis to Barron	4,017	6	1.25	508.9	0.30	0.11	8
Barron to Lombard	3,971	8	1.92	314.0	0.30	0.10	3
Lombard to Deer Park	3,987	8	1.65	637.3	1.00	0.57	7
Deer Park to Nathan	4,206	8	1.97	812.3	1.00	0.60	8
Nathan to Josephine	4,454	9.5	2.05	444.0	1.00	0.83	4
Josephine to Canyon	4,645	10	2.41	585.5	1.00	0.92	5
Canyon to Fanalulu	4,869	10	1.58	518.1	1.00	0.59	6
Fanalulu to Moyne	5,062	8	2.15	455.1	1.00	0.70	4
Moyne to New Dorsey	5,209	3	0.40	125.5	0.82	0.44	5
New Dorsey to Hamen	5,346	6	0.99	271.2	1.00	0.83	6
Hamen to Loweth	5,573	6	1.12	253.0	1.00	0.95	4
Loweth to Bruno	5,789	10	2.60	603.4	2.00	1.28	5
Bruno to Lennep	5,491	10	1.75	508.4	1.10	0.92	5
Lennep to Groveland	5,225	4	0.11	195.0	1.00	0.60	7
Groveland to Martinsdale	5,001	1	0.03	7.2	0.99	0.80	4
Martinsdale to Selkirk	4,812	2	0.15	44.3	1.00	0.64	6
Selkirk to Two Dot	4,624	2	0.12	42.2	1.04	0.58	7
Two Dot to Valencia	4,427	4	0.37	16.9	0.81	0.44	5
Valencia to Harlowton	4,290	1	0.06	18.1	0.60	0.39	5

* Elevation at first place.
† Scaled from profile.

consumption of energy during the summer months as compared with the winter months will be noted. The figures for the passenger service are approximate, as the ton-mile data is based on the assumption of an average weight per car, no record of the particular cars handled in all the separate trains being available.

TABLE VI—ST. PAUL ELECTRIFICATION—DISTRIBUTION OF OPERATING COSTS FOR 1919

	Account	Total All Services	Per Unit
255.	Power substation buildings	$8,487	$606.00 per bldg.
257.	Power transmission system	1,773	4.87 per mile
259.	Power distribution system	78,461	179.00 per route-mile
261.	Power line poles and fixtures	24,299	55.50 per route-mile
306.	Power substation apparatus	40,224	2,870.00 per station
383.	Train and yard power produced	102,152	7,300.00 per station
395.	Total	$255,396	

1.	Cost per thousand gross ton-miles trailing freight as actually distributed in accounts	28.8 cents
2.	Cost per thousand gross ton-miles train freight as actually distributed in accounts	24.9 cents
3.	Cost per thousand gross ton-miles trailing freight on basis distribution in proportion to freight kilowatt-hours	30.2 cents
4.	Cost per thousand gross ton-miles train freight on basis distribution in proportion to freight kilowatt-hours	26.2 cents
5.	Cost per actual kilowatt-hours, delivered to locomotives	1.1 cents

TABLE V—ST. PAUL ELECTRIFICATION—OPERATING STATISTICS FOR 1919

Month	Thousand Gross Ton-Miles, Trailing	Net Kw.-Hrs. per Thousand Gross Ton-Miles, Trailing, At High Tension Bus	Net Kw.-Hrs. per Thousand Gross Ton-Miles, Trailing, At Locomotive	Net Kw.-Hrs. per Thousand Gross Ton-Miles, Train, At High Tension Bus	Net Kw.-Hrs. per Thousand Gross Ton-Miles, Train, At Locomotive	Load Factor	Cost of Kw.-Hrs. per M. Trailing, Gross Ton-Miles, Cents
Freight Service:							
Rocky Mountain Division							
Jan.	98,478	47.8	36.3	41.2	31.3	63.7	25 7
Feb.	79,859	43.1	27.3	37.3	23.6	57.7	24 0
March	118,297	39.0	29.3	33.9	25.5	65.3	20 9
April	121,646	38.5	25.6	33.1	22.0	61.1	20.7
May	124,395	36.5	26.1	31.7	22.6	56.0	20.9
June	122,264	36.7	26.2	31.7	22.9	56.4	20.9
July	120,723	36.7	24.3	31.6	20.9	55.4	21.3
Aug.	111,092	40.9	27.2	34.9	23.2	54.6	22.4
Sept.	115,787	39.7	25.6	34.1	22.0	58.8	21.7
Oct.	108,920	45.8	29.2	39.4	25.1	60.0	23 6
Nov.	86,267	44.0	29.6	37.7	25.3	50.9	27 8
Jan.-Nov.	Avgs.	40.5	27.7	34.8	23.8	57.3	22.5
Missoula Division							
Jan.	87,598	44.3	29.9	38.6	26.1	....	23.8
Feb.	73,481	39.8	26.2	35.2	23.2	....	21.7
March	103,613	40.3	25.8	35.6	22.8	....	21.6
April	109,133	38.5	25.4	34.1	22.4	....	20.2
May	118,331	37.9	25.1	33.5	22.2	....	20.3
June	116,660	37.8	25.6	33.3	22.5	....	20.3
July	106,045	38.1	25.0	33.5	22.0	....	20.4
Aug.	101,017	38.8	24.6	34.3	21.8	....	20.8
Sept.	99,578	38.5	25.9	34 1	22.9	....	20.6
Oct.	100,504	40.0	27.1	35.3	23.9	....	21.4
Nov.	78,459	45.3	29.5	39.2	25.5	....	24.3
Jan.-Nov.	Avgs.	39.7	26.3	35.0	23.1	....	21.3
Rocky Mountain and Missoula Divisions Combined							
Jan.-Nov.	302,507	40.1	27.1	34.9	23.5	....	21.9
Jan.-Dec.	476,085	....	....	....	....	....	22.3
Passenger Service:							
Jan.-Nov.	340,480	56.8	38.7	39.7	27.1	....	38.4
Jan.-Dec.	378,080	....	....	....	....	....	38.1

The cost of maintaining and operating the transmission lines, substations and trolley system for the year 1919 is given in Table VI and a final figure thus arrived at showing the approximate total operating costs involved in the delivery of the electric energy to the locomotives.

CONCLUSION

The installation being comparatively new, it might naturally be assumed without consideration of other facts that the figures for the maintenance are considerably lower than those which will eventually obtain, but it should also be borne in mind that the maintenance and operating costs given will, except for power, remain more or less constant so far as any consideration of their being affected by the business handled is concerned, so that the cost per thousand ton-miles would be correspondingly reduced as business is increased. It is also expected that considerable improvement will be effected in maintenance methods, which would again tend to reduce costs. The figures are therefore given merely to show the results which are at present being obtained.

Schuylkill Railway Installing Telephone Dispatch System

THE Schuylkill Railway, Girardville, Pa., is installing a telephone dispatch system over its entire property. The wires are being placed on the 6,600-volt high tension poles and are properly protected with fuses ahead and behind. Telephone instruments are being located at each turnout in an iron box with the proper switch lock, to which each conductor carries a key. When completed jack boxes will be located at convenient points between the regular telephones and each car will carry a phone with an extension cord. Kellog 2,500-ohm 5-bar ringer instruments are being used.

Rochester Accepts New Agreement

Service-at-Cost Contract Between City of Rochester and New York State Railways Passed by City Council on July 14—Balancing Fund and Sliding Scale of Rates Features of the Agreement—Commissioner of Railways Has Heavy Responsibilities

ROCHESTER has at last agreed upon a plan for solving its railway problems. The new service-at-cost agreement will go into effect on Aug. 1 with 7 cents or ten tickets for 65 cents and free transfers as the initial fare conditions.

The agreement extends until Aug. 1, 1930, and incorporates a clause giving the city the right of renewal for another ten-year period. Pending an appraisal the value of the property is fixed at $17,500,000, and this sum is taken as the temporary base value upon which a return is allowed.

The existing franchise of the New York Railways contains a 5-cent fare clause, and therefore the company could obtain no financial relief from the Public Service Commission and the city could not obtain better service due to the financial condition of the company. The service-at-cost agreement was the solution to the situation.

It is the purpose of the city and the company in entering this agreement so to arrange their affairs that the company shall provide the very best service which it is possible to give under any system of careful, scientific and economical management and to secure to the company a proper return upon the value of the property used in service.

Duties of City Commissioner

Articles I and II of the agreement define terms and outline the general objects and considerations of the agreement. Article III deals with an officer called Commissioner of Railways and defines his powers and duties.

The duty of the Commissioner of Railways is fundamentally to administer the terms of the contract on behalf of the city. He is appointed by the Mayor subject to the approval of the Council and receives a salary of $12,000 per year from the railway company.

The commissioner "shall have power and it shall be his duty to direct the making of extensions, betterments and permanent improvements; to direct the making of repairs, renewals and replacements; to direct the purchase of cars and parts thereof, and all other items of equipment, the purchase of real estate, the abandonment and replacement of equipment of every kind whatsoever. He shall have power to select and designate materials used in track construction and items of equipment, as to quality, type, kind and class. He shall direct the routing and rerouting of cars, fix and determine all places for cars to stop; fix and determine all schedules, headways, the rate of speed of cars, methods of operation, and do, order and direct generally in respect to operation. . . ."

The commissioner is limited, however, by restrictive clauses covering orders for unprofitable extensions or service, and in case of dispute his decisions are subject to review by a board of arbitration. The commissioner must work through the company organization in actually carrying out his duties, while the company, on the other hand, must furnish him office space and clerical help, pay the salaries of his department, keep such accounts as he may designate and furnish him with duplicates of all its accounts, orders and other operating and engineering records.

The commissioner passes on all purchases and accident claims, salaries and wages and any other items affecting the cost and kind of service. The franchise prohibits any labor contract which does not contain an arbitration clause.

The commissioner has all the legal and accounting force of the city at his disposal and must make quarterly reports to the City Council and Mayor.

An interesting provision is that the commissioner shall have power, with the consent of the company, to install and carry out such supplemental transportation and methods of transportation in connection with surface cars operated hereunder as he and the company shall determine to be proper and necessary in the interests of good service.

Value and Rates of Fare

The commissioner is protected in tenure of office against any summary dismissal. He must contract to resign in case of a permanent disability, misbehavior, or if he shall in any way become incompetent to fulfill the obligations of his office, but if he fails to do so he can be removed only through the enforcement of his contract by a suit in equity in the Supreme Court.

Article IV of the agreement deals with the value of the property and, after establishing the sum of $17,500,000 as the "temporary base value," provides that a board of three men shall appraise the property immediately. The board is to consist of a representative of the railway company, a representative of the city and a third member agreed upon by the first two members or appointed in case these two disagree. "They shall immediately proceed to appraise and determine the fair value of the property of the company actually used and useful in the operation of the lines, including all property from which any revenue is derived under the terms of the contract." The finding of the board is final and only subject to review by a court.

The cost of the appraisal is to be paid by the railway company and the value determined is fixed as the sum upon which returns are to be based. This value is only subject to change due to abandonments or betterments involving capital accounts. Any dispute as to additions or abandonments is to be arbitrated.

The rate of fare is dealt with in Article V. A single uniform fare is to be charged and universal free transfers are to be given. The commissioner may, however, direct a transfer charge to be put in force, and he may likewise cause to be put in force a larger fare on "owl cars." The fare charged varies from time to time as described later and eight rates of fare are provided for, rate E to go into effect at the beginning of operation under the agreement. The several rates are as shown in table on page 232.

Rate	Cash	Tickets
A	3 cents	six for 15 cents
B	4 cents	seven for 25 cents
C	5 cents	ten for 45 cents
D	6 cents	nine for 50 cents
E	7 cents	ten for 65 cents
F	8 cents	ten for 75 cents
H	9 cents	twelve for $1
G	10 cents	eleven for $1

In Article VII it is provided that at the beginning of the contract the sum of $300,000 from the company's working cash shall be deposited to a separate account to be known as a "balancing fund." The fund is augmented or decreased, of course, depending on the total cost of operation.

Article V goes on to say, with reference to the variation of rate of fare, that "when the 'balancing fund' shall exceed the sum of $300,000 by the sum of $200,000 on the first of any month on the first day of the following month the fare shall change to the next lower rate, and shall continue to change each month until the 'balancing fund' is found to equal or exceed $500,000." When the balancing fund on the first of any month is less than $200,000 the fare shall advance to the next higher rate on the first of the following month and continue to advance on the first of each month until the balancing fund shall exceed the sum of $300,000." These provisions do not apply until the rate then in force has been in operation three months. Provision is also made for adequate advance notice to the public of a change in fare. A minimum of one week is required.

Article VI makes provision for the return to the company based on value and rate of fare.

The company is to receive as its sole income a return on the base value which is fixed by the rate of fare in force. For fares of 7, 8, 9 or 10 cents the return is to be 6 per cent per annum. For a 6-cent fare the return is 6.5 per cent; for 5 cents, 7 per cent; for 4 cents, 7.5 per cent, and for 3 cents 8 per cent. If a transfer charge is ever introduced it is not to affect the rate of return paid the company.

The important questions of disposition of revenues and the provision and definition of funds are the subject of Article VII. There is first provided a "general fund," in which all revenues of the company shall be first deposited and accounted. From this fund shall be paid:

1. Operating expenses, which shall include:
(a) Maintenance of ways and structures.
(b) Maintenance of equipment expense.
(c) Traffic expense.
(d) Conducting transportation expense.
(e) General and miscellaneous expense. (Each lettered subhead is further divided into many detailed items.)
2. All taxes, including federal, state, corporate and income taxes properly allocated to operations hereunder.
3. The return to the company on the base value and the temporary base value.
4. The compensation and expenses of appraisers.
5. The salaries of the commissioner and his assistants, and all expenses in connection with the commissioner's office.
6. All other expenses which the company and commissioner agree should be paid from the general fund.

Renewal and Depreciation Fund

There is then provided a renewal and depreciation fund, to which shall be credited a sum equal to 2 per cent per annum of the base value, which sum, however, may be increased or decreased by mutual agreement of the company and commissioner. These charges shall be computed and made monthly. This fund is to be expended only for renewals and replacements, it being the intent that the cost of maintenance shall be met and paid as an operating expense.

The "balancing fund," already referred to, receives all moneys remaining in the "general fund" after payments provided for have been made. Computations and transfers are to be made monthly. On the other hand, if accounts due and payable out of the "general fund" exceed the amount therein the deficit shall be made up by transfer from the "balancing fund."

This fund's "normal" value is a part of the base value and includes all allowance for working capital. The commissioner may require the company, however, to provide other cash for temporary or emergency purposes, to take advantage of favorable markets, etc., but the company is allowed interest at 6 per cent on all such cash advanced, and if it costs the company more than 6 per cent it shall be reimbursed, the additional cost to be paid as "operating expense."

Bond discount, required in case of financing extensions or betterments, shall be an "operating expense" and paid from the "general fund."

Extensions and Abandonments

Article VIII provides that extensions, betterments and permanent improvements may be proposed by the company or the commissioner and shall be carried out only when the commissioner shall direct. The work is to be done largely by the company organization, although contracts may be made if approved by the commissioner. Disputes as to the method of handling specific cases are to be settled by arbitration.

The commissioner is limited in his orders for direct expenditures for extensions and improvements to the sum of $400,000 after the expiration of the fifth year of the term of the agreement and other financial limitations are placed on such expenditures unless both the company and the commissioner approve the expenditures, in which event no limitation is placed on the sum to be expended.

The city has the right to finance and build any lines or extensions it desires and turn them over to the company for operation. The company when operating such lines is to reimburse the city for their cost and this sum is to be added to the base value. The city may also retain ownership while permitting the company to operate lines or extensions so constructed and financed.

The commissioner may direct the abandonment of any property, including real estate, which he deems no longer useful or which he believes should be replaced. The value of this abandoned property is to be subtracted from the base value.

The suburban lines, covered in Article IX, are under the jurisdiction of the Public Service Commission, but come under the cost-of-service agreement in the event the city enlarges its corporate limits to include them.

Article X disposes of a local controversy and Articles XI and XII provide for the usual protection and non-sale or transfer of property and for the company's liability to the public.

Article XIII is devoted to arbitration. Arbitration is provided for only those cases specified in the agreement and specific exceptions are taken to any arbitration as regards rate of fare, base value, rate of return or interpretation of the agreement.

The company must notify the commissioner within five days after receipt of his order in order to take advantage of any arbitration clauses.

The arbitrators are to consist of a company representative, a city representative and a third man selected by the first two arbitrators. In the event they cannot agree on a man he is to be appointed by the senior justice of the Supreme Court for the Seventh Judicial District.

The arbitrators are instructed to investigate and try the matter before them in a formal manner in accordance with established rules of evidence and procedure. The arbitrators are paid on a fifty-fifty basis by the city and company.

Breach of contract is provided for in Article XIV. A penalty of $500 a day in liquidated damages may be recovered in a civil suit, which shall be paid out of income and not revenue.

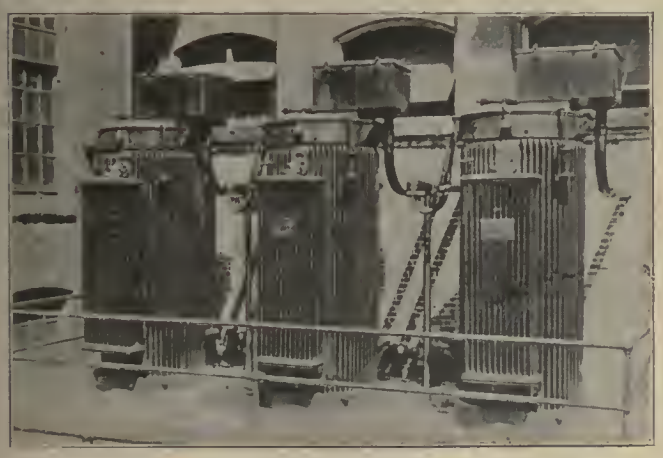
Articles XV, XVI, XVII and XVIII contain miscellaneous provisions for the modification of existing contracts, for various minor matters, for the legality and legal effect of the contract and for the termination and renewal of the agreement. Article XIX provides for the official execution of the contract by the Mayor of the city and the president of the company.

Conclusion

The terms of the contract are in general similar to other cost-of-service contracts, although the power of the commissioner is itemized in more detail. The commissioner has more duties to perform than any one man in a railway organization has been able to perform in the past, so no doubt he will require an experienced and numerous staff to carry out his duties. This agreement offers one more opportunity for actual trial with the cost-of-service type of franchise.

Outdoor Installation of Transformers

THE General Electric Company has developed a new type of bushing for outdoor type transformers of moderate voltage. This bushing, which has received the approval of the inspection department of the Associated Factory of Mutual Fire Insurance Companies, should make it possible to dispense with transformer houses. These transformer houses are specified, in some localities, by insurance companies, their construction being determined by insurance requirements and safety first considerations.



TRANSFORMER INSTALLATION AT PACIFIC MILLS, LAWRENCE, MASS.

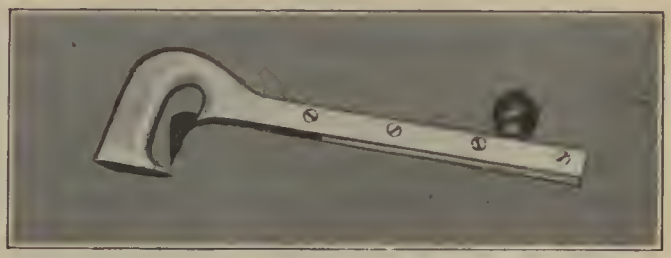
The scheme provides that all circuits, generally above 600 volts, be brought to the housing in underground cable. This cable above ground is in a metal duct which is securely fastened to the transformer cover, all exposed parts being at ground potential and waterproof. The waterproof feature is essential, from the underwriter's standpoint, in making it safe for firemen to play streams on burning buildings near the transformers without danger.

Since the circuits to the transformer will generally consist of waterproof lead-covered cable, provision is made in the outboard portion of the housing for enclosing a standard end bell, corresponding to the circuit voltage.

Ample clearance is provided in the housing. The transformers receive standard high potential test with housings in position and without any taping or other insulation on the bushings. The use of these transformers is only limited, as regards voltage, by the voltage limits of the underground cable.

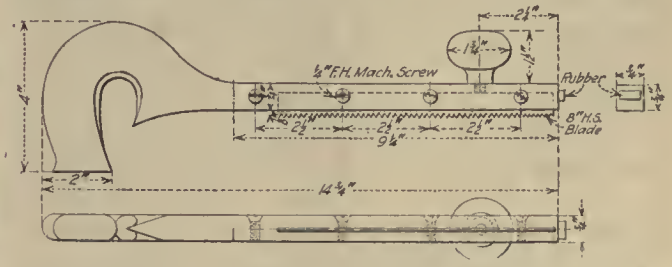
Hand Saw for Mica Undercutting

IN THE shops of the Wilkes-Barre & Hazleton Railway and the Lehigh Traction Company, Hazleton, Pa., the majority of the mica undercutting on the armatures is done by hand. For this work a special saw has been made under the direction of James W. Brown, superintendent of shops.



THIS ALUMINUM FRAME WITH ORDINARY HACKSAW BLADE MAKES A LIGHT AND EFFICIENT SAW FOR MICA UNDERCUTTING

The main body of the saw frame consists of an aluminum handle, made in a local foundry, according to specifications furnished by the railway company. As is clearly shown by the accompanying drawing, only one-half of the blade arm is aluminum. The other half is made of brass, primarily with the idea that the thread for the screws would hold better in brass than in aluminum. An ordinary 8-in. hacksaw blade is used and is clamped in position by means of four screws which pass through the aluminum side of the frame and are threaded into the brass side. These screws do not pass through the saw blade, so the latter is readily adjustable for depth of undercutting by loosening the screws. A piece of hard rubber is set into the end of the saw, so that the striking of the saw at the end of the slot will neither be annoying nor harmful. The knob handle on the top of the saw is from a controller handle.



CONSTRUCTION DETAILS OF HAND SAW FOR UNDERCUTTING MICA

Letters to the Editors

Engineering Organizations to Be Listed

DEPARTMENT OF COMMERCE, BUREAU OF STANDARDS,
WASHINGTON, D. C., July 16, 1920.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for July 10 you call attention to the need for a handbook of technical and allied organizations. The Bureau of Standards has long recognized this need and has in an advanced state of preparation a bureau report that will list about 150 technical and commercial organizations either actually engaged in or interested in engineering standardization. It is believed that this report will fill the need, felt by many engineers, for an authoritative and up-to-date list of organizations, giving their purpose, their membership, extracts from their constitutions and addresses of their secretary. It is hoped to publish the report in the near future and to make revisions as needed.

F. C. BROWN.

Interurbans Also Have Problems

THE WINONA INTERURBAN RAILWAY COMPANY
WARSAW, IND., July 21, 1920.

To the Editors:

I have your inquiry concerning the rumor that part of the Winona lines between Warsaw and Peru is to be abandoned, but this rumor is without foundation.

Our situation is very much like that of other traction companies in that we are headed for the readjustment rocks as fast as we can go. If a favorable solution of the problem is not reached in a short while there is no question but that a large number of interurban lines will receive through tickets for the junk heap.

As I view the matter, the interurban industry has been swallowed up and lost in the general discussion of the traction problem. In these days the public thinks of the traction problem as a situation having to do with the street railway industry of our larger cities and but little attention is paid to the problems confronting miles and miles of interurban roads connecting thousands upon thousands of cities, villages and hamlets.

It would seem to me that city street car service and interurban service are entirely different operations and should therefore be treated as separate industries. Street railway problems are purely local and each city line is confronted with operating conditions which are substantially different from those of a city line in another city. An interurban property performs an entirely different service. Its traffic, instead of moving between city blocks, moves between cities, and is therefore not governed by the policies of street railway operation. Interurbans perform practically the same service as steam railroads.

I notice that the JOURNAL of July 10 contains very little if any reference to interurban lines. The discussion is almost entirely directed toward city operation. Please refer to the articles, written by Messrs. Pardee, Dana, Rawson, Higgins and others to see my point.

Why not have some discussion on the interurban situation, entirely independent of the street car mess? Why should we allow the local problems confronting Toledo, Cleveland and other cities to permeate the entire industry, and in particular to be made a factor in the discussion of the interurban situation.

I like the sentiment expressed in your editorial "What We Are Going to Do." If we handle our end of the problem the public will do the right thing.

J. C. SCHADE,
General Manager.

[Some of the articles in the issue of July 10 referred to interurban problems. That of Mr. Lewis, for example, was almost entirely on this subject. But we invite further contributions on ways by which their peculiar problems may be solved.—EDITORS.]

Locomotives for Gothard Line

OERLIKON, PRÈS ZURICH, July 8, 1920.

To the Editors:

The United States consular report by Trade Commissioner Groves on Swiss railway electrification, mentioned on page 1159 of your issue for June 5, contains an error where it says that "the locomotives for the Erstfeld-Bellinzona line are being built by Brown, Boveri & Company of Baden." This is not true, as all of the locomotives for the freight trains on order for the Gothard line, which practically consists of the Erstfeld-Bellinzona line, are being built and have in part already been delivered by our own firm and the Swiss Locomotive Works of Winterthur, the two firms dividing the work among themselves somewhat the same way as the Westinghouse company and the Baldwin Locomotive Works in your country divide the work on the construction of Westinghouse-Baldwin locomotives.

Furthermore, the Brown, Boveri locomotives are not being built by that firm alone, but jointly with the Swiss Locomotive Works. Will you kindly correct your note in one of your early issues.

ATELIERS DE CONSTRUCTION OERLIKON.

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Representative at Traffic Officers' Convention

THE American Electric Railway Association will be represented at the meeting in San Francisco on Aug. 23-27 of the National Traffic Officers' Association. W. H. Maltbie of the United Railways & Electric Company of Baltimore, a member of the association's committee on code of traffic principles, will be the association's representative at the meeting, at which he will present an address on traffic regulation from the standpoint of the electric railways. Mr. Maltbie, among other things, will advocate the adoption of the principle that street cars are entitled to the right of way on their tracks.

The Traffic Officers' Association is an organization of the traffic officers of the police departments in the different cities, and one of the principal objects of the convention is to frame a model motor vehicle act to be placed before the various state legislatures and the provinces of Canada. Electric railway companies which are especially interested in this subject could well send representatives to this convention.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Service at Cost Urged

New York Commissioner Recommends Flexible Rate Plan for City Lines —Sees Fare Reduction

Adoption of a cost-of-service plan on the traction lines of New York City was urged in a statement issued on July 25 by Public Service Commissioner Lewis Nixon of the First District. Commissioner Nixon declared that, in his opinion, the making of service-at-cost agreements with the various operating companies would result in an ultimate reduction in fare.

Commissioner Nixon issued his statement in the expectation that several railways would shortly apply to the Public Service Commission for fare increase under the decision of the Court of Appeals confirming the commission's power to raise fares under certain conditions. Mr. Nixon outlined a tentative program for the New York City lines as follows:

Each of the present railroad systems to be simplified by the consolidation or merger of its constituent companies into one railroad corporation, and, if possible, a unified control of all systems brought about.

All holding companies (not railroad companies) should be abolished.

Perpetual franchises to be surrendered and to be replaced by terminable or indeterminate franchises.

All leases and underlying contracts to be terminated.

The city to have the option of acquiring the properties at an agreed valuation. If the city so elect, the purchase price may be amortized out of earnings.

A flexible fare to be provided, automatically adjusted to meet the cost of service. The cost of service should be so fixed as to cover reasonable return on values, the rates paid on such investment to be those warranted by fixed rather than speculative return.

Fair Return Urged

A standard of service of car-mile per revenue passenger to be fixed arbitrarily for six months between certain limits. During such time careful investigation should fix such limits definitely.

Recommendations covering the purchase of new equipment and the putting into effect of service to secure greater efficiency shall be submitted.

The investment which is entitled to return shall be determined by a committee of three to be named by the Court of Appeals, if it can so act, of which one member, however, shall be nominated to the court by the city.

The cost of service fare shoud yield a fair and adequate return upon the cost of capital actually invested in the plants, and this does not mean the cost of reproduction nor the carrying of obsolete, worn-out or dead equipment or facilities.

Outstanding bond and other capital issues must be weighed with full history of their issuance, the prices received for the same and the disposition of the proceeds.

All superseded property cannot be considered in an estimate, but due consideration as to posibilities to amortize such property out of returns shall be given, and if the committee should conclude that any such property is a proper charge to be included in the cost of property entitled to a return, it shall be added or carried in a suspense account and charged to operating expense over a term of years. . . .

A system of accounting based upon that of the Interstate Commerce Commission, modified to suit the requirements of the local situation, is to be established. The standard of service, of course, must be maintained.

The investment account, once determined and approved, is to be increased or decreased only with the approval of the Public Service Commission.

Replacement Fund Proposed

There shall be established a renewal and replacement reserve, maintained by the payment thereto of a certain percentage of the investment in depreciable property, and an injuries and damage reserve, maintained through credits and charged to operating expense.

State and city taxes to be considered as a part of the cost of service; the federal income tax, however, to be a matter for separate adjustment.

The flexible fare control fund shall be formed by crediting to it returns in excess of the cost of service. This fund to have an upper and lower limit controlling the decrease respectively in fares.

Railway Helps in Housing Inquiry

The Kansas City (Mo.) Railways is co-operating with the Chamber of Commerce in an investigation of the housing problem. The industrial department of the chamber has conducted a preliminary investigation, responsive to statements that demand for houses was far beyond the supply. Less than 10 per cent of industrial establishments to which questionnaires were sent returned answers indicating the need of houses, for rent or purchase, by their employees. On the face of these partial returns, the housing situation does not appear to be serious. Still it is known that several large employers have kept men constantly busy looking for living quarters for employees. The difficulty of securing co-operation in the inquiry, from the many industrial plants, has caused the industrial committee to look to the Kansas City Railways for more definite data.

The general situation is somewhat confused by the inclination of workers who have lived in Kansas City several years to declare their need for residences, such need being a desire for better homes than they have been occupying. The railway, however, is constantly employing men who have not previously lived in Kansas City; and many of these are unable to find homes to which to bring their families from other towns, or from the farms. The railway is therefore inquiring into the need for homes for its employees, the kind of homes desired, and the availability of such homes. This report, when completed, will be the basis of further action by the Chamber of Commerce. Tentative plans are now being made definite, for organizing and financing a housing corporation on such scale and with such program of building as may be necessary in the light of the further data soon to be at command.

Will Accept Award

Bay State Officials and Carmen to Abide by Findings of Arbitration Board

Acceptance of findings of the arbitration board which is considering the demands of the employees of the Eastern Massachusetts Street Railway, Boston, Mass., has been promised by Homer Loring, chairman of the public trustees of the company, and James H. Vahey, counsel for the company. Mr. Loring and Mr. Vahey have advised Chairman Ogden of the arbitration board of their intention of abiding by the board's decision.

The company has defaulted with regard to the payment of interest on bonds to the extent of $725,604 for the year ended June 1, 1920, and $2,014,225 on the payment of dividends, Mr. Loring told Chairman Ogden. Under a moratorium clause of the mortgage, unpaid bond interest to the extent of $461,625 and a penalty of $92,325 must be paid before Dec. 30 of this year or the bonds defaulted.

Supervisory Force Reduced

The witness testified that $500,000 was expended by the road last winter in fighting snow and ice, $326,000 of which was spent in February. He said that a saving of $196,310 was effected by the road during the year ended May 1, 1920, by reducing the supervisory force from 925 employees to 700 and a saving of $34,900 was made by cutting down the salaries of the executives. He said that every time the fare has been increased, no matter how slight, there has been a reduction in traffic.

Mr. Loring said that the State of Massachusetts "has made a mistake almost approaching a calamity" in allowing street railway lines to close down, and he pointed out that while millions of State money have been spent to make good roads, the railroads, the carriers of the working people, have been allowed to deteriorate and to be abandoned.

151 Miles Discontinued

Mr. Loring said that since the receivership went into effect, in 1918, 151 miles of lines have been discontinued out of a system of approximately 900 miles. Many lines were continued for months with the company taking substantial losses in the effort to maintain service for the public, but when the equipment became useless through wear, the lines were finally dropped instead of built up, because the company's treasury could not stand the burden.

P. R. T. Men Patient

Employees Postpone Wage Advance Until Company Secures More Revenue Through Fare Readjustment

Confidence in President Thomas E. Mitten of the Philadelphia Rapid Transit Company was expressed by representatives of all employees of the company by the casting of a unanimous vote to wait until the company's revenue increases in volume to the amount necessary to pay increased wages which became effective May 16 and June 1, 1920. The unanimous vote of confidence cast by the 250 employees' representatives was indorsed by their fellow-employees when they made known their decision upon their return to the company's shops, carhouses and offices.

T. E. MITTEN expressed his appreciation of the result accomplished by the co-operative committeemen and those whom they represented. The action of the convention followed an address by Mr. Mitten in which he reviewed the agreement between the company and the men, by which the wages paid in Philadelphia are determined by the average maximum wage of four cities: Chicago, Cleveland, Detroit, Buffalo. Mr. Mitten said, in part:

The wage established by the average paid in these four cities up to May 1, 1920, produced a maximum rate of 65 cents an hour for trainmen in Philadelphia; wages in other departments adjusted in a similar ratio.

On May 16, 1920, Detroit increased its maximum wage for trainmen from 60 cents to 75 cents an hour.

Chicago, on June 1, 1920, increased the maximum rates for the trainmen from 65 cents to 80 cents an hour.

Chicago actually began giving the men the increased wage on July 15 and expects to pay the amount due for high wages for the period between June 1 and July 15 by installments.

In the early experience, under the co-operative plan, in 1913, the company's earnings fell off in such large volume that the 22 per cent fund, which then controlled the wages paid to the men, was insufficient to support the maximum rate per hour then established.

Company Goes More Than Half Way

The company, however, did not reduce the wages because of the deficit in the 22 per cent fund, but for more than two years paid out more money in wages than the 22 per cent fund produced.

The time is now here when the men have an opportunity to reciprocate. The company, in paying the 65 per cent rate, anticipated increased receipts from the tariff filed with the Public Service Commission.

The wage scale established on the 65-cent basis represents an increase above the 58-cent rate of $2,100,000 annually.

The new rate established by the latest increase at Detroit and Chicago will produce a maximum rate of 72½ cents an hour for trainmen with wages of other departments adjusted proportionately. This represents another increase in wages of approximately $2,250,000 annually, making a total of $4,350,000 increased wages accomplished in 1920 by applying the average of the four cities on the basis of wage adjustment in Philadelphia.

Higher Fares Must Precede Wage Rise

The company cannot pay this further increase to the men until the Public Service Commission permits the collection of such additional revenue from the passengers as will make the payment of this larger wage possible. I, therefore, submit for your consideration the following plan:

(a) That the wages based on the 65-cent rate at the present time being paid should not now be disturbed.

(b) That as soon as the increased revenues received by the company permit the new rate based on the 72½ cent rate should be made effective and paid to the men from the date forward.

(c) That the wages shall at that time be made retroactive to the dates upon which Detroit and Chicago advances were effected: May 16 and June 1, 1920. That the amount due to each man from the advanced wage from May 16 to June 1 paid to the date upon which the payment at the new rate is begun in Philadelphia shall be credited to his account and the sum total paid over to each employee as quickly as the increased earnings will permit.

Indorsement of the action of the representatives has been filed by the employees in every branch of the service and letters received by the management explicitly state:

We will stand back of President Mitten to a man in anything he does in connection with the management of the Philadelphia Rapid Transit Company, knowing full well from past experience that our cause is in good hands, and we approve this action of our representatives with three hearty cheers and best wishes for his success in all his undertakings.

The action of the P. R. T. men is hailed by the Philadelphia *Public Ledger* as indicating a new spirit of co-operation between management and labor. In a long editorial dealing with the P. R. T. case the *Ledger* said:

It is an astounding situation. We have all known vaguely that Mr. Mitten has had extraordinary success in dealing with his men. And there is no more important factor in the success of any enterprise involving a large labor problem today. But it will come as a cheering surprise to the people of Philadelphia that Mr. Mitten cannot only get the hearty and efficient co-operation of his men when he is raising their wages and meeting their demands, but that he can carry them with him to a man even in this grinding era of high prices when he asks of them that they keep on working at lower wages and permit him to put off an already pledged increase of pay. That is surely the record. If any other great executive has been able to do this, we have not heard of it.

The men voted confidence in Mitten and paid for the privilege of doing it. Only a record of just dealing, sympathetic treatment and faithful adherence to promises can have won so complete a trust. We stress this point, for it is of vital importance in this period of labor unrest and the unmeasured mischief which flows from it, that Philadelphians should appreciate how valuable an asset they possess in a manager of their most important public utility who can establish and maintain such relations with his men. A similar *entente cordiale* between other executives and their employees would save this nation a pile of money, a vast amount of worry and an industrial and transportation disorganization which does much to keep up the high cost of living.

Commenting in similar vein upon the stand taken by the men, the Philadelphia *Evening Star* said on July 26:

It shows that "Tom" Mitten has won and enjoys the genuine confidence of his men and that they trust him. It shows that Mr. Mitten is a phenomenal manager of labor, since he has won such confidence, and it shows that under the co-operative scheme which Mr. Mitten devised and set up the personnel of the P. R. T. employees has reached a very high standard, for unless the men of the company were of a high standard they would not be equal to this very expressive and potent "gesture," as our friends in diplomacy would call it.

This emphasizes once more what we have often commented upon, that the Mitten management has shown the way to gain real co-operation between employer and employed. While strikes and conflicts are the order of the day and employers and employed almost everywhere are bickering, the employees of the P. R. T. to a man and by the motion of one of them, which received more seconders than could be recorded, decided upon this self-sacrifice in order to support the man at the head of the company.

There is a good augury in this. It shows what may be accomplished by fair and decent treatment of employees and what support employees will give their chiefs when they know their chiefs mean well by them. Unrest and revolution may rear their ugly heads where they will, we have still the instance of this noble act and we see from it that the American workingman is still a man and an American in all respects and that he quickly responds to fair and decent treatment.

Des Moines Outlook Clears

Council Plans Valuation of Railway System, with View to Higher Fare—Sliding Scale Proposed

The first definite step looking to a solution of the traction muddle in Des Moines, Iowa, was taken last week when the City Council of Des Moines took steps to employ an expert to determine the true valuation of the plant of the Des Moines City Railway and to report back to the Council. In introducing the resolution in the Council for the employment of an engineer, Commissioner Budd stated this was the first step in a movement which he would foster toward a sliding scale of fares. The resolution was unanimously adopted and steps will be taken at once looking to the retention of an expert.

Differ on Valuation

Later in the week the Council called into consultation Max Toltz of the firm of Toltz, King & Day of St. Paul, and discussed with him the plan of trying to arrive at a fair valuation of the plant. At the present time there is a difference of $2,500,000 in the valuation claimed by the Des Moines City Railway and that placed on it by H. W. Byers, special counsel for the city of Des Moines in its statement with the public service corporations. Mr. Toltz, in his conference with the Council, advised that such an investigation as the Council desired would cost the city at least $10,000 and would extend over a period of two months at least.

Neither the Des Moines City Railway nor the citizens' public service committee, which recently made an investigation of the local railway question, were represented at the meeting of the Council. Scott Goodrell, city traction supervisor, told the Council that at the present time the city is getting as good railway car service as the revenues of the company will permit. He stated that the only way to improve service in Des Moines is to grant an increased fare.

Extra Service Opposed

Mr. Goodrell opposed the idea that additional cars put in service would mean additional revenues for the company and called attention to the fact that a definite test of this plan had been made a few months ago on one of the lines of the city and resulted in a loss of $10 a day upon the extra cars put into service. Mr. Goodrell estimated the cost of operating a car eighteen hours a day as $53.64. The

company is now operating under the direction of Judge Martin J. Wade of the Federal Court. Approximately two years ago a receivership was declared. F. C. Chambers, now general manager, and Homer K. Miller are the receivers in charge of the company.

Four years ago the company was granted a twenty-five-year franchise calling for six tickets for a quarter. During the war period the City Council allowed the company to charge a straight 5-cent fare. A year ago a special election was called on a proposition to increase the fare to 6 cents, but the measure was defeated, largely through disagreements between the union of electric railway employees and other unions of the city. Last fall Judge Wade allowed the company to make material cuts in the off-hour service, although rush-hour service is maintained at former standards.

San Diego Employees Insured

Employees of the San Diego (Cal.) Electric Railway share in a life, health and accident insurance plan started recently by the Spreckels companies in San Diego and San Francisco. Both life insurance and the pensions are given without cost to the employees. The health and accident insurance is furnished through the newly organized Spreckels Employees' Mutual Benefit Association. Each member allows the company to retain 50 cents a month out of his pay, and a like amount is contributed by the company to a fund which is to provide free medical attention to the employees and members of their families, and an income of half their regular wage for a period of not more than twenty-four weeks in cases of sickness or accident not covered by the state industrial insurance. Hospital service is allowed in exceptional cases or where it is necessary to operate immediately, or where a member is living alone.

The insurance plan is based on length of service and provides the following payments to beneficiaries:

Over sixty days but less than six months, $150.
Over six months but less than nine months, $175.
Nine months but less than one year, $200.
One year but less than two years, $250.
Two years but less than three years, $300
Three years but less than four years, $400.
Four years but less than five years, $500
Five years but less than six years, $600.
Six years but less than seven years, $700
Seven years but less than eight years, $800.
Eight years but less than nine years, $900.
Nine years and over, $1,000.

J. A. Moon, assistant to Traffic Manager M. J. Perrin, is the electric railway employees' representative on the board of directors of the Employees' Mutual Benefit Association. He holds the position of assistant treasurer. Other members are: H. P. Wellman, chairman, San Francisco; W. G. Blackie, treasurer, San Francisco; Walter Ramage, secretary, San Francisco; F. E. Miles; auditor, San Francisco; W. A. Turquand, vice-chairman, Hotel del Coronado; C. A. McGrew. assistant secretary, San Diego Union; H. D. Huff, assistant auditor, San Diego.

Mayor Urges Sympathetic Attitude

Norfolk Executive Pleads for Co-operation Between Municipalities and Utilities—Sees City Ownership a Failure

Pleading for closer co-operation between public utilities and the communities which they serve, Mayor Albert L. Roper of Norfolk, Va., in addressing the convention of the Southern Gas Association in that city recently, appealed for a more sympathetic attitude toward public service corporations. Mayor Roper laid especial emphasis upon the fact that adequate transportation is essential to every city and town. He deprecated the "short-sighted, penny-wise and pound-foolish policy" adopted by many city councils whereby railway systems are starved to death at the expense of the community. Mayor Roper stated that if he had his way he "would prop up every public utility on its last legs and keep it going through times of stress and tribulation." The expression of Mayor Roper's views is of especial significance because of the action recently taken by the city authorities with regard to the local lines of the Virginia Railway, Light & Power Company. Under his direction the city of Norfolk has entered upon a valuation of the company's property for the purpose of fixing a fair return on the capital invested. The matter of a just return for gas has already been agreed upon.

MUNICIPAL ownership is a failure, according to the Mayor. He also regards the idea of a fixed fare as "just as idiotic as to say that potatoes shall always sell for 40 cents a peck, regardless of what it costs to produce them." He believes that every utility is entitled to a rate sufficient to take care of fixed charges and operating expenses and, in addition, to a fair return on the investment.

Mayor Roper said, in part:

In welcoming to Norfolk an organization such as this, I do not feel that I am welcoming to the city a set of men who are engaged in a private industry. As a matter of fact, you are a part of the greatest fabric of civilization in this country. Manufacturers of gas are to be placed, of course, in the same rule as the men who furnish us transportation. We have had a great deal of misunderstanding about the public utility people. I speak with a great deal of sympathy for the gas men, as I do with a great deal of sympathy for the seller of transportation, because I believe that he has been misunderstood. For years it was the outdoor sport of some of the politicians of this city to do every conceivable thing they could to block the game of the public utilities of the city. It made no difference what was the virtue of the proposition which was being put forward by the public utilities. Because it was desired by the public utilities, it was wrong. As a matter of fact, these bickerings went on to such an extent that there was no possibility of getting through the Council anything resembling a fair settlement of the difficulties and differences between the city and the public utilities.

You can readily understand what a short-sighted, penny-wise and pound-foolish policy that is. It was due to a very large extent to the public utilities; it was due to an equally large extent to the municipal authorities; both were wrong. They were wrong simply because the public utility man went at his game from the standpoint of the return on the dollar invested. The only apparent idea for the operation and perfection of their plant was that they must get the largest possible return from their invested capital. I say they were wrong in that. The municipalities were wrong, on the other hand, in that they felt that the public utilities should conduct a philanthropic enterprise, losing sight of their invested capital, and give service regardless of the cost. These opposing views are the cause of the clash all over the United States and all over the world, and are responsible for the difficulty through which certain classes of public utilities are passing today.

Deprecate Municipal Ownership

One of the remedies suggested for the evil was public ownership of the public utilities. Personally, I do believe, except in a very modified degree, in public ownership of public utilities. I may go so far as to say that so far as our national Government is concerned, I think the sooner they let go of some of the things they are trying to do at the present, the better business is going to be and the more promptly we are going to get back to that normal to which all of us fondly look.

This whole proposition seems to me a very simple matter. I can see no difference between the man who sells potatoes and the man who sells service, whether it be gas, electricity or transportation. The man who sells potatoes takes into consideration the amount of money he has invested in his establishment, the cost of producing those potatoes, his loss on the potatoes that spoil, and his overhead operating expenses, adding to that a certain amount agreed upon as profit. . . .

Fixed Fare Condemned

The idea of a fixed price or unit for the sale of transportation, to me, is just as idiotic as to say that potatoes shall always sell for 40 cents a peck, regardless of what it costs to produce them. Therefore, I am in favor of that attitude toward the public utility by a municipality, which shall provide a revenue to the public utility sufficient to take care of the invested capital, depreciation, the overhead costs, and, on top of that, a fair return on the investment. The fare may be 5 cents a unit of travel today, may be 6 cents tomorrow, it may be 10 cents six months from now, and a year from now it may be 4½ cents. But whatever it is, the man who invests his money in service, whatever type the service may be, is entitled to a fair return upon his investment over and above what it costs him to produce that service, just as truly as the man who buys trees, cuts them and makes them into hewed lumber and sells them is entitled to a fair return. . . .

The whole thing comes back to this: That the municipality has a right to expect all the service that the public utilites can furnish consistent with their operating costs and a fair return. The public utility, on the other hand, has no right to expect a larger return for its investment than is consistent with the service it renders. Do not look at the one and not look at the other; there is a mutual relation. It is this co-ordination of interest which brings about and is going to bring about that condition of affairs in our economic world, so far as you gentlemen are concerned, which you desire and which, I believe, any self-respecting community is going to desire. . . .

City Hurt by Bankrupt Utility

People have said to me, "Let the old traction company go hang, it would be a good thing if it did go into bankruptcy." My reply was, "I don't know what the effect on it will be by being bankrupt, but God knows I don't want it to go into bankruptcy from the standpoint of the city of Norfolk."

I trembled to think what would happen, what would be the confusion, what would be the interruption to business, if our public utilities were put into bankruptcy. The first step taken when a receivership occurs would be that the non-profitable, non-paying lines would be stopped, and our suburbs would be without transportation. The only things that operate under receivership conditions are the short hauls, where lines can make money easily, and no receiver is going to do anything solely for the municipality, as his business is to develop, to demonstrate what he can do with the lines. Do not talk to me about this business of bankruptcy for public utilities. If I had my way, I would prop up every one I saw on its last legs and keep it going through times of stress and tribulation, in order that the time might come in the development of such enterprises when it could live on the substance furnished it.

Toledo Vote Enjoined

Judge Killits Enjoins Submission of City Bond Plan to Voters—Measures Held Illegal—Doherty Accepts Service-at-Cost

There will be no referendum on the twin bond ordinances designed to acquire and construct a municipally owned transportation system for Toledo, Ohio, as scheduled for the primary election on Aug. 10. Judge Killits, of the Federal Court, upon hearing of the arguments on dismissal of the injunction suit brought by the Toledo Traction, Light & Power Company against the county election board, granted the injunction on July 24. As an evidence of good faith and at what was claimed to be a real sacrifice, Henry L. Doherty, as chairman of the board of the Toledo Railways & Light Company, pledged the company's acceptance of the Milner cost-of-service franchise ordinance with the valuation of $8,000,000 as finally fixed by the commission and sent to Council by Judge Killits.

MR. DOHERTY took care not to admit that this was the true valuation of the traction property but said that in the interest of a quick settlement and to stop "inflammatory talk," he would agree to accept the $8,000,000 figure as a compromise. This turn of affairs makes it impossible for the two plans to come up at the November elections.

Bond Plan Held Illegal

The contention of the company in the injunction suit was hinged upon the legality of the twin ordinances for bond issues aggregating $7,000,000. The city officials and counsel for the election board admitted that one section of the city charter had not been complied with in their passage through Council. The Judge, who helped to write the charter a few years ago, ruled that this particular section of the city charter was mandatory and that the ordinances were therefore illegal.

The most interesting of all of the developments in the hearing of the case came when the court attempted to find out what the mysterious "plan" of the muncipal ownership enthusiasts was. Chairman Henry Ashley, of the commission which drafted the plans; Councilman Harry Curtis, campaign manager for the bond ordinances; City Service Director David Goodwille, who headed the valuation commission, and other members of the municipal ownership commission were subpœnaed by the court to help get at the facts. Most of the city officials disclaimed any knowledge of a particular plan for the using of the money. The traction interests claimed that there was an ulterior motive in the efforts to put through the bond issues.

Would Abandon Many Lines

There are in the present system of the Toledo Railways & Light Company 116 miles of track. Chairman Ashley said his plan was to eliminate seven of the present lines and to have a system containing only sixty-five miles of track. This he admitted would deprive thousands of people of service now furnished by the Rail-Light. He said the plan for limited trackage was based upon maps showing density of population, but he would not indicate where lines would be built.

He declared that the present railway system would be dismembered through condemnation proceedings. He indicated that there were no more than sixteen miles of the present system that the commission would consider worth keeping in the municipal system.

The so-called "system" was to have a series of radial lines in the congested districts of the city carrying passengers out to the one-mile or two-mile circles, and from these points to use buses for the completion of trips. The present city is plotted in some directions out as far as the eight-mile and ten-mile circles. Mr. Ashley proposed to have a five-minute service on the railway and a ten-minute service with buses.

Plan Called "Futuristic"

The real purpose of the ordinances became apparent when Mr. Ashley told the court that the people had been brought up on the slogan of "millions for defense but not a cent for tribute." In 1914 the people ratified a plan to issue bonds for $8,000,000 to be pledged against the street car property. This plan was never carried out, but the ordinances still remain. It developed that the municipal ownership plan might have in it the use of $7,000,000 derived from general credit bonds, the $8,000,000 authorized to be levied upon the traction property itself, and a scheme to "extend the credit of the city without bonds" as Mr. Ashley put it.

Passage of the Milner ordinance has been urged by Judge Killits, who maintains that in enacting the measure the city would be in the position of offering a fair plan of settlement.

Five-Cent Rise in St. Louis

The Missouri Public Service Commission, sitting as a board of arbitration on the wage demands of the employees of the United Railways of St. Louis, has awarded an increase of 5 cents per hour, retroactive to June 1. There is to be no changes in hours and working conditions. This increase will make the schedule of platform wages as follows: First year men, 55 cents; second year men, 60 cents; third year men, 65 cents. Extra men are guaranteed a minimum of $100 a month provided they shall be available for service at heavy loading points for collection of tickets and issuing of transfers, when required.

The wages of other employees for whom a specific rate per hour was demanded is to be increased 5 cents per hour. The payment of back wages is to begin on Aug. 1, and the company will have to Jan. 1, 1921, to pay the back wages. Counting the present increase as 10 per cent, the increase in street car men's wages since June 1, 1918, has been slightly more than 115 per cent.

Twin City Board Reports

Arbitrators Recommend Higher Fare and Pay Increase in Minneapolis—Council Takes Action Soon

After a series of meetings lasting three weeks the arbitration board sitting at Minneapolis, Minn., has made two sets of recommendations looking to settlement of the demand for increased wages by the trainmen of the Minneapolis Street Railway. The report to the City Council recommends sanction of increases of fare from 5 cents to 7 cents, with four tickets for a quarter. The report to the company recommends increase of trainmen's wages 10 cents an hour, or to a maximum of 70 cents, the increase to be retroactive thirty days from date of sanction of an increased fare by the Council.

It was announced that an ordinance would be introduced July 30 for action by the City Council along lines indicated in the board's report. Owing to the probability of objection by the seven socialist aldermen to an immediate second reading of the ordinance draft, postponement of action until Aug. 6 is the outlook.

The increases outlined in the board's wage recommendation to the company are as follows:

First year men, 55 cents per hour; second year men, 58 cents; after two years, 60 cents. Trainmen working more than nine hours a day to be paid for each hour or part thereof over nine hours: First year, 65 cents; second year, 68 cents; after two years, 70 cents. All bonus men and extra men to be paid not less than $4.30 a day. Except in emergencies, such as cases of fire, failure of power, storms, etc., trainmen shall not be required to make additional trips unless willing to do so.

Schedules will be based as follows: 40 per cent of runs to be completed in eleven hours; 20 per cent to be completed in twelve hours; 40 per cent to be completed in thirteen and one-half hours. The company shall furnish eight-hour runs to those who wish them.

Every trainman shall be allowed vacation leave with pay at the rate of one day a month for each month of service from July 1, 1920, month by month or at one time, as desired, providing the employee has worked for the company at least one year.

Other employees working at hourly rate shall receive a 20 per cent increase.

Employees receiving yearly compensation are increased as follows: Not more than $1,800 a year, 20 per cent; not more than $2,400, 20 per cent on $1,800 and 10 per cent on all above that sum; not more than $3,600, 20 per cent on $1,800, 10 per cent on $600 and 5 per cent on remainder.

W. S. Bemis, who has been chosen to make a physical survey of the St. Paul City Railway as a basis to discover whether the company is entitled to an increase in fare from 5 cents upon improving the service as ordered by the Council ordinance, has taken the preliminary figures to Chicago for consultation with E. W. Bemis, who is the expert employed for this valuation.

Meanwhile trainmen of the Twin City Rapid Transit Company are holding in abeyance their strike order dependent on prompt action by the Council of the two cities.

Buffalo Strike Averted

Intervention by Governor Postpones Threatened Walk-out—State Board to Pass on Demands

Danger of an immediate strike of platform men on the local and interurban lines of the International Railway, Buffalo, N. Y., has been averted by Gov. Alfred E. Smith, who has ordered an investigation into the financial affairs of the company by the State Labor Board. The first session of the board was held in Buffalo on July 29.

Although the stage had been set for a strike because of the failure of the arbitrators elected by the men and the company to agree upon an umpire to settle the wage question and other grievances after almost two months, officers of the Amalgamated Association refused to call the walkout. "By striking we would be playing into the hands of the company, which favors a strike to break the union and establish an open shop," said William B. Fitzgerald, international organizer of the Amalgamated.

Settlement in Sight

The intervention of the State Labor Board in the dispute has had a soothing effect upon the situation with the result that it now is believed the two arbitrators can get together and agree upon an umpire. President Herbert G. Tulley of the International has withdrawn his demand that only a member of the Public Service Commission should serve as umpire.

The State Public Service Commission in a decision handed down by Chairman Charles B. Hill holds that it is without authority to intervene in the situation and no member or official of the commission could sit as umpire in the arbitration proceedings. President Tulley contended that any increase in wages granted the employees by the arbitrators should be passed along to the car riders in the form of increased fares because the additional revenue received from the 7-cent fare already is being paid to the employees in higher wages. By voting to increase the wages of the company's employees, President Tulley believes that an official of the Public Service Commission sitting as umpire in the arbitration proceedings would be in a position to know the company's financial condition and to give relief by having the commission grant another fare increase.

Railway's Financial Needs

A review of the financial condition of the International by the State Labor Board is expected to bring about the report that the company is not in a position to grant additional wage increases at this time. The report of the board would be used by the company in making its application to the Public Service Commission for another fare increase, to which the municipal authorities say they will enter vigorous objections because of the company's failure to enter into negotiations with the City Council for a service-at-cost agreement proposed by Mayor George S. Buck some time ago.

Closed Shop an Issue

The great question in dispute between the union platform employees and the railway is the "open shop." The company insists that it will never again sign a contract with the Amalgamated. The present contract expired May 1. President Tulley has told the men he will insist upon the open shop principle hereafter. The union originally demanded a wage increase for platform men from 48 to 88 cents an hour. The company immediately raised the men to 60 cents an hour, an increase of 12 cents an hour. The union asked for an eight-hour day, but the company said no concession in hours could be granted. President Tulley has agreed, however, that if the men in the shops, carhouses and power houses express a desire for an eight-hour day after the wage question is settled, that provision can be written into the contract.

Mr. Tulley on July 29 addressed to Lieutenant-Governor Walker, chairman of the State Labor Board, a letter outlining the company's position. Mr. Tulley stated that "the company is desirous of establishing more direct contact with its men, and will enter into no further contract which does not recognize and assure uninterrupted continuance of the open-shop principle."

Labor Poll Concluded

United States Chamber of Commerce Members Vote Against Public Utility Strikes

The members of the Chamber of Commerce of the United States have voted almost unanimously against strikes being permitted on public utilities. It will be remembered that last month the chamber decided to take a referendum on two questions relating to anti-strike legislation for public utilities. These questions, which were published on page 1268 of the issue of this paper for June 19, follow:

(1) Should strikes by employees of all public service corporations performing public service essential to the lives, health, security, comfort and well being of the people by law be explicitly enjoined?

(2) Should suitable tribunals be created by law to adjudicate differences between the employees of public service corporations and their employers, and the decisions of such tribunals be final and binding upon both parties?

On the first question the vote was: for, 1564; against, 97.

On the second question the vote was: for, 1571; against, 100.

In addition to this referendum, one was conducted at the same time on industrial relations in general, including the right of open shop operation and the right of employers and employees to deal directly with each other without participation by outside interests. There were in all twelve questions in this referendum, and the vote gave overwhelming approval among other things, to the open shop, to the right for direct dealing, and to condemnation of a restriction of productive effort or output.

Wage Increase Refused

Ohio Electric Unable Further to Raise Carmen's Pay — Men Asked Closed Shop Policy

The Ohio Electric Railway, Springfield, Ohio, on July 24 returned to its motormen and conductors, unsigned, a new contract which the latter had presented a few days previously. J. H. McClure, vice-president of the company, in a letter to the men, said the company is not now in financial condition to grant an increase in wages and called attention to the fact that increases had been denied on several of the company's city lines. The only place where an increase has been given was on the Zanesville line, and this was only a slight advance.

The company is now confronted with the question of a source of sufficient revenue to pay operating expenses and taxes and to maintain the property in proper physical condition for safe operation, he said, and he suggested that the present agreement be continued until at least some of these difficulties are out of the way.

Men Asked Closed Shop

Demands made by the men include an agreement on the part of the company to meet and treat with accredited officers and committees of the union on all grievances; to refuse, after a thirty days' trial, to retain any one in its employ who proves unsatisfactory to the union; to employ only members of the union and to see that those applying for positions shall first secure permission of at least two members of the executive committee. This would mean a closed shop contract.

The proposed contract provided that the workday be figured on a ten-hour basis, all runs to pay for ten hours and all time over ten hours to be paid for at the rate of time and one-half. The wage scale demanded was as follows: For the first three months, 75 cents an hour; for the next nine months, 77 cents an hour; for one year and thereafter, 80 cents; freight helpers, 55 cents and an additional 10 cents an hour for freight train crews. The men now receive from 41 to 50 cents per hour on the interurban lines and 38 to 47 cents on city lines.

In addition the men asked for free annual transportation books for employees on city and interurban lines, trip passes for members of their families on request and a vacation on pay for fifteen days at least once a year.

Increases in Wages in Oakland

The San Francisco-Oakland Terminal Railways, Oakland, Cal., has increased the pay of its city trainmen as follows:

	Old Rate, Cents	New Rate, Cents
First three months	48	52
Next nine months	52	55
Second year and thereafter	54	59

On the interurbans the increases were:

	Old Rate, Cents	New Rate, Cents
First three months	50	54
Next nine months	53	57
Second year and thereafter	55	61

Gas Situation Critical

Leading Official of New York Company Summarizes Situation in Statement —Coal Question Grave

The situation of the gas companies, as many readers of this paper know, is somewhat like that of the electric railways. They are faced with largely increased expenses for coal and other materials essential in the manufacture of gas, with consequent need for corresponding rates. George B. Cortelyou, president of the Consolidated Gas Company of New York, recently summed up the situation in the following words:

The emergency is immediate and far reaching. It embraces the entire industry. The economic conditions—many of them of world-wide extent and influence—affecting the supply of coal, oil and other essential materials required in the manufacture of gas, of labor and of the funds needed to maintain and develop our properties are not bogies invented by the industry to secure preferential treatment, excessive rates or unwarranted returns upon investment. They are plain facts.

All over this land today gas companies, great and small, are rendering, often under most adverse conditions, this service so vital to the welfare and comfort of our people. What they need and should have, in the interest of the public, is the reasonable certainty of adequate rates, a sufficient supply of coal, oil and other necessary supplies and such manufacturing and operating conditions as will utilize and conserve these materials as well as contribute to all other possible economies of production and distribution.

Joliet Increase Accepted

The Chicago & Joliet Electric Railway, Joliet, Ill., effected a settlement with its car and shop men on July 1 on the basis of the original offer of the company, the wage scale per hour being as follows:

Main line, interurban division	65 cents
Lyons, Lockport & Dellwood Park divisions of interurban line	62 cents
Joliet city lines:	
First three months	56 cents
Next nine months	58 cents
Second year and thereafter	60 cents

Nine hours will constitute a day's work, with time and one-half for overtime.

All other employees will receive corresponding increase of 10 per cent over the old scale.

At a special meeting of the men, on June 30, eighty-five voted to accept the company's proposition against fifty-six voting to reject the offer.

B. R. T. Men Ask 30 per Cent More

Demands for wage increases and improved working conditions were presented on July 28 to William S. Menden, general manager of the Brooklyn, (N. Y.) Rapid Transit Company, by a committee representing the three Brooklyn locals of the Amalgamated Association of Street and Electric Railway Employees of America. The committee, which was accompanied by P. J. Shea, International vice-president of the union, planned to submit similar demands to H. Hobart Porter, vice-president of the Brooklyn City Railroad.

The committee demanded an eight-hour day, with a limit of twelve hours for those on swing runs, and time and one-half pay for all overtime. Other demands are: For surface motormen and conductors, from 84 cents to 92 cents an hour, the present schedule being from 52 to 62 cents an hour; switchmen and car cleaners, 55 cents an hour. For Sunday and holiday work, 10 cents extra an hour. A six-day week and a twelve-hour rest period after each day's work.

For elevated conductors, 87 cents to 90 cents an hour is asked. The present rates are from 54 cents to 57 cents. For guards on the elevated and subway lines from 82 to 85 cents an hour is demanded, the present pay being from 49 to 52 cents an hour. The contract under which the men are now working will expire on Aug. 28.

News Notes

Japan Planning Electrification.—A bill has been introduced by the government in the Japanese Parliament creating the Imperial Electric Railway. The aim of the bill is to establish electric power supply for railroads and gradually to convert roads to electricity.

Arbitrators Meet at Alton.—A board of arbitration composed of L. C. Walcott, David M. Walsh and C. E. Smith met on July 21 to consider the question of the wages to be paid the trainmen of the Alton, Granite City & St. Louis Traction Company, Alton, Ill. The men, who have demanded an increase in wages, are now receiving from 46 to 51 cents an hour. The present fare in Alton is 8 cents.

Offers Fifteen per Cent Rise.—Clinton Q. Richmond, general manager of the Berkshire Street Railway, Pittsfield, Mass., has offered the employees of the road a wage increase amounting to 15 per cent. The men previously rejected an offer by the company for an advance of 10 per cent. Carmen now receive $4.50 for a nine-hour day. They ask $6.50 for an eight-hour day.

Wages Raised on Interurban.—A wage advance of 15 cents an hour has been granted the trainmen of the Rochester & Syracuse Railroad, Syracuse, N. Y. The pay of shopmen and freight handlers has also been raised. The trainmen have been receiving 47 cents an hour. They demanded 90 cents, but compromised on 62 cents. A request for an eight-hour day in place of the present ten-hour one was denied. The pay increase is retroactive to May 1.

Will Arbitrate Newport Wages.—Articles of arbitration have been signed by officials of the Eastern Massachusetts Street Railway, Boston, Mass., and representatives of the carmen of the company's Newport, R. I., division. Two members of the board of arbitration which will pass on the carmen's demands for higher wages and changes in working conditions have been named. H. Lloyd Rooney will represent the union, while Robert S. Goss of Fall River will represent the company.

Ask 75 Cents in Memphis.—A demand for an increase in wages to a scale of 75 cents an hour has been presented to T. H. Tutwiler, receiver for the Memphis (Tenn.) Street Railway by the company's employees. Under the present contract, which expires July 31, the men receive from 42 to 48 cents an hour, depending on the length of service. An important provision of this contract is that if no agreement as to the rate of pay for the ensuing year can be agreed upon by July 31 the men will remain at work, and the scale of pay, whenever it is agreed upon, will be retroactive to Aug. 10.

Improvements Wait on Wages.—Until the wage scale reaches a minimum of 52 cents an hour there will be no money spent on improvements to the system of the London (Ont.) Street Railway. The system is being operated by the Ontario Railway & Municipal Board, and the men are working for 48 cents an hour, with the understanding that when the receipts warrant it they will receive an increase in pay. Citizens are dissatisfied with the service and the cars. In regard to the latter, many are declared to be antiquated, and only a few of them are equipped with air brakes. But the men demand that they shall come first, and that all improvements must wait on the wage increase.

Tramway Carmen to Compete.—*Partners*, the magazine of the Dallas (Tex.) Railway, has been awarding $1 a month for the best true-to-life story submitted by employees. The Denver (Col.) Tramway *Bulletin* in a recent issue says that it too is interested in what the carmen do with their spare time. It will go even further than *Partners*. Two prizes of $1 each will be offered to the tramway employees. The first award will go to the contributor of the best true-to-life story and the second prize will go to the contributor of the funniest story. When possible the stories will be printed in the *Bulletin*, whether or not they are among the prize winners.

Bus Hearings Continue.—The Board of Estimate in New York City devoted last Wednesday morning to hearing arguments against a proposed general bus system. The principal spokesman was Arthur G. Peacock, counsel for the Interborough Rapid Transit Company. Others who appeared in opposition to the bus were representatives of the employees of the New York Railways and of real estate interests and tax-payers' associations. An important protest was registered by the Brooklyn Chamber of Commerce, which declared that a city-wide bus system would further complicate the existing transit difficulties and increase the discomfort of the public. During the session Mayor Hylan denied he was committed to any plan of city transportation.

Financial and Corporate

West Penn Does Well

Net Income Available for Dividends on Line in Pan Handle Increased 22 Per Cent

A remarkable increase in earnings for the year ended Dec. 31, 1919, is shown by the West Penn Railways, Pittsburgh, Pa., with a balance to surplus of $678,693 after all dividends on both preferred and common had been paid. This is an increase over 1918 of 77 per cent. Passenger revenue increased 13.7 per cent, and although the operating expenses increased 18.8 per cent, the net operating revenue is on the increase with a percentage change of 5.6 over 1918.

INCOME STATEMENT—WEST PENN RAILWAYS

Year ended Dec. 31	1919	1918	% Inc. over 1918
Total railway revenue	$10,634,611	$9,352,905	13.7
Total railway operating expenses	6,801,227	5,722,236	18.8
Net operating revenue	$3,833,384	$3,630,669	5.6
Taxes (excluding Federal income and profits tax)	357,295	269,491	32.6
Operating income	$3,476,089	$3,361,178	3.2
Non-operating income	452,256	365,296	23.8
Interest charged to improvement accounts	201,387	34,278	487.0
Gross income	$4,129,732	$3,760,752	9.8
Deductions from gross income:			
Interest on funded debt	$1,916,348	$1,708,442	12.7
Interest on floating debt	69,830	85,390	—18.2
Amortization of discounts	113,750	160,079	—28.4
Dividends paid on stocks of subsidiary companies	192,952	195,314	— 1.2
Total deductions from gross income	$2,292,880	$2,149,225	6.7
Net income	$1,836,852	$1,611,527	14.0
Federal income and excess profits taxes	192,686	263,705	—27.0
Net income available for dividends	$1,644,166	$1,347,822	22.0
Dividends paid	965,473	965,473	0.0
Balance to surplus	$678,693	$382,349	77.5

The net income available for dividends increased 22 per cent. This increase is mainly due to the interest charged to improvement accounts being increased 487 per cent and the total deductions increasing only 6.7 per cent, while the gross income increased 9.8 per cent.

NET INCOME INCREASES

The passenger revenue increased to a greater extent than the car miles or car hours. The net income increased 1.42 cents per car mile or 7.9 per cent over 1918, while it increased 16 cents per car hour, or 8.4 per cent. The operating ratio appears to be increasing instead of decreasing, the increase being slightly over 4 per cent.

The West Penn Railways and its subsidiary railways own and operate 339.25 miles of electric railways, largely interurban, in Western Pennsylvania, the Pan Handle of West Virginia and eastern Ohio. The company was created in May, 1917, by a consolidation of a company of the same name, West Penn Traction Company and a number of other affiliated street and interurban railways in Pennsylvania whose lines formed a connected system. Since the consolidation the preferred stockholders have increased from about 1,400 to 2,450.

Bay State Lines Losing

All but one of the "home rule" districts of the Eastern Massachusetts Street Railway, Boston, Mass., are falling behind, according to testimony presented by Homer Loring, chairman of the public trustees, before the board of arbitration which is hearing the demands of the system's employees for higher pay. All but Fall River have showed deficits since September, 1919, when the "home rule" plan was put in operation.

The Fall River district showed a profit between Sept. 1, 1919, and April 30, 1920, of $44,105. The deficits of the other districts for the period of "home rule" operation were enumerated as follows:

District	Deficit
Chelsea	$373,313
Lynn	138,606
Salem	199,869
Gloucester	130,589
Lowell	70,574
Lawrence	112,351
Haverhill	68,180
Hyde Park	98,838
Quincy	278,411
Brockton	135,249
Taunton	86,637
Hull-Hingham	3,507

STATISTICAL INFORMATION—WEST PENN RAILWAYS

Year ended Dec. 31	1919	1918	% Inc. over 1918
Miles of single track	339.25	339.25	0.0
Total car miles (passenger and express)	9,436,320	8,935,660	5.6
Total car hours (passenger and express)	888,919	844,226	5.3
Ratio CM to CH (speed m.p.h.)	10.6	10.58	0.2
Passenger revenue	$10,634,611	$9,352,905	13.7
Passenger revenue per mile of single track	$31,390	$27,600	13.7
Statistics, per car mile:			
Operating revenue	$1.127	$1.046	7.7
Operating expenses (cents)	72.10	64.20	12.3
Net income (cents)	19.47	18.05	7.9
Statistics, per car hour:			
Operating revenue	$11.97	$11.07	8.1
Operating expenses	$7.65	$6.78	12.8
Net income	$2.07	$1.91	8.4
Operating rates—per cent	63.8	61.2	4.2

P. R. T. Application Fails

Financial Relief Refused by Public Service Commission Pending Fixing of Valuation

The financial outlook for the Philadelphia (Pa.) Rapid Transit Company took on a graver form on July 26, when the State Public Service Commission issued a ruling suspending for the present the proposed increase in fare in the shape of a 3-cent charge for transfers on the P. R. T. lines. The commission's order is made pending an appraisal of the P. R. T.'s property. The commission's action came as a surprise, and for the present at least deprives the company of additional revenue estimated at $3,000,000 annually.

REVENUE NEEDED FOR WAGES

The company had counted upon the additional revenue to meet the higher wages which were to have been paid the employees, but which the latter recently waived following a statement by Thomas E. Mitten, president of the P. R. T., on the company's financial condition. The company had hoped to place the 3-cent exchange rate in effect on Aug. 1. As the commission will not sit again until September, there is little hope of an increase before Jan. 1.

The commission also rendered a decision in which it refused to dismiss the demurrers filed by the Northwestern Business Men's Association attacking the payment by the P. R. T. of rentals to its underlying companies. These rentals amount to $10,000,000 annually and have been the subject of much discussion between the city and the company. The decision opens the whole subject to review, although there is some doubt as to the jurisdiction of the commission. The underlying companies were given ten days in which to file an answer to the suit and a hearing was set for September. The board of directors of the P. R. T. on July 26 elected Frank Buck, a large stockholder, and W. C. Dunbar, financial vice-president of the company, directors to succeed Horatio G. Lloyd and C. W. S. Packard, resigned. The seat vacated by E. T. Stotesbury, chairman of the board, was not filled. On Wednesday and Thursday of this week Union Traction stock on the Philadelphia Exchange sold at around 23 and Philadelphia Rapid Transit stock around 13. Four weeks ago Union Traction sold around 28 and P. R. T. around 18½.

Public Service Shows Loss

Net Income for June Drops to $4,114, Reflecting Wage Increase of $150,000 a Month

In the statement filed with the State Board of Public Utility Commissioners by the Public Service Railway of New Jersey covering operation for the month of June, the effect of the voluntary wage increase recently granted the company's employees is clearly seen. Net income dropped to $4,114 as compared to $223,166 for the corresponding month of 1919. The increase in wages amounted to $150,000 for the month.

The financial statistics as compared to the corresponding month in 1919 show an encouraging increase in gross revenue, but this is more than offset by the rise in operating expenses caused by the wage increase.

The financial statement for the month follows:

June	1920	1919
Total operating revenue	$2,242,992	$2,083,349
Operating expenses and taxes	1,881,392	1,437,679
Operating income	$361,599	$645,669
Non-operating income	67,832	5,758
Gross income	$429,431	$651,427
Fixed charges	425,317	428,281
Net income	$4,114	$223,166

The chief item of increase in the cost of operation was the wages of motormen, conductors and trainmen, which increased from $458,335 to $628,015 during the year.

Of the passenger revenue last month $2,120,736 was derived from cash fares and $68,198 from revenue transfers. During the month the company carried 30,534,512 revenue passengers and 7,075,972 transfer passengers, or a total of 37,610,484.

San Francisco Reorganization Hearing Aug. 30

The California Railroad Commission has set Aug. 30 for a hearing on the application of United Railroads, San Francisco, for approval of the reorganization plan.

Of the $23,500,000 of 4 per cent bonds of 1927, holders of $22,657,000 par value have assented to the modified plan and deposited their securities. The holders of practically all the $5,200,000 underlying bonds have also agreed to the reorganization.

The commission has had its engineers at work checking up valuations and the hearing is for the purpose of allowing objections to be made publicly if they develop.

The reorganization committee has expressed its intention of issuing the new securities in exchange for present holdings as rapidly as circumstances will permit, but this cannot be done until formal approval of the plan is granted by the commission.

It is also the intention of the committee to pay on the new 6 per cent cumulative prior preference stock dating from April 1 last. The new prior preference stock will be given to present 4 per cent bondholders to the extent of 50 per cent of par value of their holdings. On this basis, bondholders are assured of interest at 6 per cent annually on $500 par value of this stock, for every $1,000 bond now in their possession.

American Railways Reports Increase in Gross

For the fiscal year ended Dec. 31, 1919, the combined income statement of the subsidiary and affiliated companies of the American Railways, Philadelphia, Pa., showed an operating revenue of $16,312,231. Operating expenses, including a depreciation reserve, amounted to $11,240,406. The operating ratio was then 69 per cent. The net revenue was $5,071,824, and with the taxes, equal to $744,808, the operating income equaled $4,327,016. Gross income for the year was $4,365,270. After deducting interest, rentals, sinking fund and other charges the income for 1919 was $1,714,831. The American Railways is a holding company. It owns and controls forty-five railway, light, power or gas companies distributed through twelve states. Of this total number nineteen are railway or traction companies.

Sees Brighter Outlook for Utilities

Brighter prospects for the holders of electric railway and other public service securities are seen by the National City Bank, New York, N. Y., which reviews the utility situation in its July bulletin. The bank regards the present as a most opportune time to take advantage of low prices for the purchase of these securities.

In discussing the utility outlook in general and the traction outlook in particular, the bank says, in part, as follows:

> June witnessed a revival of interest in public utility issues, and new issues were promptly absorbed by discriminating investors. It has been unfortunate that the investing public has neglected public utility issues during the past year, largely as a result of the tragic position in which we find some of our major traction properties. In the traction field, however, there are many situations which merit confidence. The present census is showing an enormous increase in urban population, but during the past decade there has been little increase in traction mileage. This has resulted in a great increase in the number of passengers carried, and earnings in many cases have been adjusted to a profitable basis. Corporations furnishing power and light are enjoying unequaled prosperity. The installation of electric power in factory operations has resulted in an enormous demand on the power companies to supply current. The large central stations have demonstrated their ability to produce and distribute power at such an economical unit cost that their position is permanently assured. The increased density of population is reflected in the growing demand for light, and it has been estimated that there are now 14,000,000 homes in the United States still to be supplied with electric light. Before the war public utilities securities issued by corporations of undoubted strength, based on strong values and earning powers, could be purchased at prices to yield from 5 per cent to 5½ per cent. Today, with largely increased values and increased demand for the output, the same class of securities can be purchased at prices to yield 7 per cent to 8 per cent.

T. H., I. & E. Improves

Gross Earnings of Indiana Road 20 per Cent More Than in 1918—Traffic Increasing

For the year ended Dec. 31, 1919, the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., shows a gross earning from railway operations of $4,480,984. This was an increase of $749,677, or 20 per cent, over 1918. Operating expenses for 1919 were $3,084,392, an increase of $612,173, or 25 per cent. Net earings were $1,396,592, as compared with $1,259,067 in 1918, an increase of $137,525, or about 11 per cent. In 1918 the taxes paid were $232,536, these payments increasing to $262,476 in 1919. This was an increase of nearly 13 per cent.

The total maintenance charges for the year 1919 were $1,059,898, an increase of $349,038. Of this amount $946,122 was expended on the railway property as against $622,307 in 1918. The interurban lines carried 8,782,328 passengers, or an increase of 179,132 or 2.0 per cent over 1918. The city lines carried 16,140,623 passengers as compared with 12,984,413 passengers in 1918. This was an increase of 3,156,210 passengers, or 24.3 per cent over 1918. The company handled a total of 138,019 tons of freight and express.

The Terre Haute, Indianapolis & Eastern Traction Company has made a specialty of transporting live stock. During 1919, 1285 carloads of live stock were hauled to Indianapolis from the surrounding towns. This is an increase of 580 carloads, or 82 per cent over 1918. During 1919 a slight revision of freight rates was authorized by the Public Service Commission, which gave the company a small net increase.

The passenger rate of fare for the year was 2¾ cents a mile, but the company now has a petition pending before the Indiana Public Service Commission asking that the rate be made 3 cents a mile. In the city of Richmond, the reduced rate tickets were eliminated, and the fare is now 5 cents with transfer. Wages of conductors, motormen, section men, etc., increased approximately 22 per cent during the year.

Grand Rapids Deficit Continues

The report of the Grand Rapids (Mich.) Railway for the month of June shows a deficit of $12,774 for the month. The gross income was $140,718. Operating expenses were $135,513, showing an increase of $9,886 over the same month a year ago. The total loss for the first six months of 1920 is $83,544. This is nearly one-third more than the loss for the whole of 1919. The report further shows that more passengers are being carried since the 7-cent fare and the rerouting went into effect. A total of 2,140,576 passengers were carried during the month, showing an increase of 123,287. The 7-cent fare went into effect June 24. Company officials estimate at least a 15 per cent increase in passengers because of the better service given.

Richmond Value Fixed

Engineers Place Value of $14,382,410 on Local Lines of Virginia Railway & Power Company

A value of $14,382,410 has been placed on the Richmond, Va., lines of the Virginia Railway & Power Company by Stone & Webster, who are making a valuation of the company's properties. Announcement of the engineers' findings was made by Thomas S. Wheelwright, president of the company, on July 21. The figure placed on the Richmond property by Stone & Webster represents the "reproduction new" cost.

Historic value of the Richmond properties of the company, or the actual cash invested in the railway business under its control from the time the business was founded, is given by Mr. Wheelwright as $20,249,400. The latter figures represent the actual investment made in the property, including interest and deducting the return.

The State Corporation Commission appointed representatives who have been following the work of the appraisers as made in Richmond and the city of Norfolk has done the same, but no action was taken by the city of Richmond, notwithstanding the company's open and continued invitations. The work at Norfolk has been completed and report has been made to the city. The work in Richmond has not been completed in all of its details.

In commenting on the company's need for a higher return, Mr. Wheelwright said:

> In the statement of earnings and expenses . . . the interest charges are estimated at 5 per cent on less than $6,000,000, and these statements show the railway is not earning 5 per cent on this sum alone, so that more than $8,000,000 of invested capital on any basis on which the matter can be figured is not getting any return at the rate of fares now in effect.

Housing Corporation Disposes of Road

The Richmond & Seven Pines Railway, the only road owned by the United States Housing Corporation, has been tentatively sold by the United States Housing Corporation to Oliver J. Sands, a banker of Richmond, Va.

The price agreed upon when Mr. Sands came to Washington for a conference with housing corporation officials and war department officers was $90,000 for the electric line and $90,000 for the houses. The agreement is that both are to be sold together or the deal is off. Mr. Sands originally offered $55,000 for the railroad and $45,000 for the houses. When this offer was turned down he increased his bid from time to time until $90,000 for each was agreed upon.

The conference was held at offices of the United States Housing Corporation. Captain Moran represented the War Department, which has an interest in the houses. The Housing Corporation, which owns the railroad outright, agreed to the prices for both the railroad and houses. Captain Moran accepted the price on behalf of the War Department, but it was understood he would have to obtain approval of his superiors before the deal could be definitely closed.

The plan of the Government to dispose of the property was noted in the ELECTRIC RAILWAY JOURNAL for May 29, page 1115.

Financial News Notes

Time for Deposits Extended.—A very large amount of the first mortgage 5 per cent sinking fund thirty-year gold bonds of the Albany (N. Y.) Southern Railroad has been deposited pursuant to the terms of the deposit agreement dated March 1, 1920. In order to give the non-depositing bondholders an opportunity to participate in the benefits of the exchange plan, the time within which bonds may be deposited has been extended to and including Aug. 2.

Will Run Huntington Lines.—The stockholders of the Huntington (N. Y.) Traction Company, Inc., voted at their organization meeting on July 20 to incorporate under the laws of the State of New York with the par value of the stock at $80,000 and to purchase the property of the defunct Huntington Railroad. The following directors were elected: Henry A. Murphy, Jack Hirschfeld, Edward McNally, W. A. Dempsey, E. B. Hawkins, E. T. Dempsey, R. H. Hunt, Frank Willette and Phillip S. McNally. Edward T. Dempsey was elected president, W. A. Dempsey vice-president and Henry A. Murphy secretary and treasurer.

Will Abandon White Plains Line.—Supreme Court Justice Joseph Morschauser has granted to Leverett S. Miller, receiver of the Westchester Street Railway, White Plains, N. Y., permission to join in a declaration of abandonment of a portion of the Mamaroneck line from the band stand in that village to the town line, and he has also ordered that the Shore Line Electric Railway show cause before him at Poughkeepsie on Sept. 11 why the corporation should not be dissolved. These decisions are in connection with the suit of the Farmers' Loan & Trust Company against the Westchester Street Railway to foreclose a mortgage.

Cities Service Shows Gain.—The report of earnings for the month of June for the Cities Service Company shows gross to have been $2,137,241, an increase of $536,224 over June a year ago. Net income, after interest and other charges, amounted to $1,922,442, a gain of $542,937, leaving a balance of $1,533,962 available for reserves, common stock dividends and surplus. Preferred stock dividend requirements were earned 4.33 times for the year ending June 30, 1920, and for the same period $40.13 a share was earned on the common stock outstanding. For the first half of the current year earnings applicable to the common stock amounted to $45.66 per share.

Equipment Trust Certificates Offered.—The Chicago (Ill.) Trust Company, as trustee, is offering for subscription an issue of 7 per cent equipment trust certificates covering the purchase by the Trenton & Mercer County Traction Corporation, Trenton, N. J., of forty one-man safety cars from the J. G. Brill Company. The issue, which has already been authorized, will close at $155,000. The certificates of this issue represent 65 per cent of the purchase price of the cars, the balance having been paid in cash and junior securities. Coupon certificates are offered in denominations of $1,000 and $500, registrable as to principal and at prices ranging from 98.76 and interest to 96.07 and interest.

Charleston Lines Losing.—A statement of the earnings and expenses of the Charleston (W. Va.) Interurban Railway has been filed with the state Public Service Commission at the request of City Solicitor Donald O. Blagg, who is representing the city in protesting against a rate increase applied for by the company. For the last four months the income on the city lines has been $108,521 and, deducting operating expenses, interest on money borrowed, depreciation and costs of new equipment, the company contends that it is $4,703 behind. Last year during the same period it lost $22,246 on the 5-cent fare then in effect. Its total revenue on all lines, city and suburban, during the first six months of 1920 was $431,312.

Sale Attacked; Receiver Asked.—R. A. Forsyth of Birmingham, Ala., a stockholder in the railway and lighting properties at Gadsden, Ala., taken over several months ago by the Alabama Power Company, has filed a bill in chancery in which he asks for a receiver for the local railway lines, the lighting plant and the ice plant. Mr. Forsyth charges that the sale of the property of the Alabama City, Gadsden & Attalla Railway and the Gadsden Railway, to the Alabama Power Company, was not a genuine one and that the price named in the deed was less than one-fifth of the actual value of the property. His petition is also in the form of a bill of discovery which seeks to declare all terms of the contract for the sale of properties illegal and to make them null and void. The petition names as defendants to the action the Gadsden Railway, the Alabama City, Gadsden and Attalla Railway, the Gadsden Ice & Coal Company, the Gadsden Railway, Light & Power Company, and the Alabama Power Company. It asks that the Alabama Power Company and the Gadsden Railway, Light & Power Company be restrained from claiming any share or interest in the property, rights, etc., of the concerns transferred to the Alabama Power Company.

Traffic and Transportation

Higher Fare Promised

Commission, After Hearing Connecticut Company's Plea, Announces It Will Grant Immediate Relief

At the close of an all-day hearing at Hartford, Conn., on July 29, the State Public Service Commission announced that it would issue an order on the following day granting relief to the Connecticut Company, New Haven, in the shape of a higher fare. The rate to be fixed by the commission would, it was reported, be 7 cents straight. The commission stated that its order would be temporary in character. Chairman Richard T. Higgins said that this temporary means of relief would be made permanent only if it proved to be a fair policy on a full trial. The whole matter would be adjourned to a not distant date he said, when it would come up for final action.

Drastic Action Needed

Judge Walter C. Noyes, chairman of the Federal trustees of the railway, made the statement to the commission that in view of the fact that the company had lost $87,000 during the period from June 1 to July 15, the measure of relief would have to be large and it would have to come quickly. The $87,000, he said, was only a small part of the actual loss of the company, as it did not include rentals, interest, taxes or other items. He predicted that without relief the road would have to shut down within six or eight weeks.

Judge Noyes sketched the recent history of the company and said that he did not believe that a "wholesale" rate was in accord with sound railway economics. Such a rate was applied by the commission in the recent zone fare matter when commutation tickets were ordered for certain suburban communities. Both Judge Noyes and President Lucius S. Storrs of the company stated to the commission that the sale of these tickets had been negligible. "Commutation passengers on a street railway mean a loss to the road," Judge Noyes said. "They come at the peak hour when the road doesn't want them. There can be no justification for the wholesale distribution of commutation privileges."

Zone Plan a Failure

Thomas J. McGreevy, an auditor of the company, presented a mass of figures to show that the distance tariff scheme which the commission ordered in effect on May 9 had not been successful. A previous distance tariff system inaugurated by the company on Nov. 2 of last year raised the operating revenues greatly, but both schemes had failed to provide sufficient money to pay taxes and rentals, let alone dividends, he said. The Bridgeport division had an excess of operating expenses over operating revenue of $50,000 during the month of June, Mr. McGreevy stated, the rest of the system falling behind $65,000 during that period.

Under the proposed plan of the company, Mr. Storrs stated, a person could travel to any point within three miles of a city's traffic center for 7 cents. On the second 7 cents a person could travel from 2.2 to 2.8 miles, the company not yet having decided as to the length of the second zone. All suburban zones, he said, would be laid out on the basis of 3 cents a mile. Expressing doubt of the company's ability to operate a 7-cent fare he said:

> If the 7-cent fare does not bring in more money, we shall have to get 8 cents, or curtail service, which we shall have to do immediately under the present fare system. We know that if we cut out certain unprofitable country and city lines that we can make the property pay, but we don't care to do that and we don't think the commission or the people want us to give up any of the lines.

E. A. Clark, of Hamden, one of the lawyers appearing in opposition to the company's petition, asked Receiver Harrison B. Freeman of the Hartford & Springfield Street Railway, who was attending the hearing, if it was not a fact that his company had lost patronage by raising fares. Mr. Freeman replied that under a 10-cent fare system now in operation on the lines of his road, the revenues had increased considerably over what they were when 6 cents was the basic fare.

Jitney Service Complementary

There are 8,250 jitney "seats" in the state, Mr. Storrs stated, dismissing the jitney idea with the statement that jitneys should act as a service complementary to that given by the electric railway. He stated that whether the proposed increase in fare would cause the jitneys to increase in number, the company did not know. But he was certain that the situation of the company had become so bad that it would make little difference what the jitneys charged.

The hearing has firmly established the precedent set by the commission at the close of the last zone fare hearing of having rates of fare fixed at the outset by the commission. The Connecticut Company installed rates of fare on previous occasions without asking permission of the commission, and the commission acted only when it received a protest from the individuals or communities. Since the commission imposed a fare method of its own devising on the company last May, however, the Connecticut Company officials felt that they should present their petition to the commission before changing the rate basis. Thus the commission is now more powerful than at any previous time in its history.

Public's Co-operation Asked

Bethel Selectmen Appeal to Citizens to Aid Local Railway, Threatened with Shutdown

Candidness in laying its financial condition before its patrons has secured for the Danbury & Bethel Street Railway, Danbury, Conn., the official indorsement of the town of Bethel. The Bethel Board of Selectmen has issued an appeal to the public to co-operate with J. Moss Ives, receiver of the company, in his effort to keep the road in operation. The board points out that the welfare of the community would be jeopardized by the discontinuance of electric railway service.

"Open Door" Policy

Mr. Ives some time ago adopted the policy of keeping the public advised of the company's condition through advertisements in the Danbury newspapers. He stated frankly that, unless the road were able to increase its revenue, service would be suspended. Recently he announced an increase in cash fare to 10 cents, stating that even with the higher rate the road might be unable to continue operation much longer if jitney competition remained unchecked.

The appeal of the Board of Selectmen follows:

To the People of Bethel:

Possibly every one in Bethel read the statement made in the *Evening News*, Saturday night, by the receivers of the Danbury & Bethel Street Railway. If so, they understand what Bethel is threatened with—the loss of its trolley service unless there is better patronage of the road within the coming month. Perhaps all do not realize what this would mean to Bethel as a town. During the past few months Bethel has had a real estate boom greater than ever before in the history of the town. While some of the sales have been to local people, many new families have come here to locate permanently. Will outsiders continue to come here if they learn that the town is such a back number that it has lost its trolley service?

Trolleys Called Essential

New industries have come into the town, and these factories are giving employment to large numbers of persons who are earning higher wages than ever before in their lives. Everyone is busy, there are no unoccupied houses, stores or factories; in fact, Bethel is booming as never before. Do we want this to continue or do we want to step over on the downward path again, for the loss of the trolley will mean a depreciation in the value of property

The jitneys are run independent of any restrcitions; on their own time and when and how they please. It has been said that were the trolley service abandoned in Bethel, the people of this town would pay more than 10 cents to go to Danbury and undoubtedly this is true. Another advantage of the trolley over the jitney is in spacious cars with plenty of ventilation and vehicles free from tobacco smoke, for while some of the jitneys have signs inside the buses calling on smokers to respect the ladies, it frequently happens that the drivers themselves are puffing on cigarettes or cigars, while if a smoker boards their bus nothing is said to him if he does not see fit to discard the weed.

Service Improvement Seen

There is no attempt on the part of the trolley company to deny that there has been ground for complaint of the service on the part of the people, but the trolley service has been entirely reorganized and better service is promised; the delays at the railroad crossing here are to be done away with, as the men operating the cars are not to leave their cars; the tedious waits on switches will also be overcome by the use of the four one-man cars which will be operated on a ten-minute headway all day between Wooster Square, Danbury, and the Greenwood Avenue crossing in Bethel. . . .

Bridgeport Rides in Motor Buses

Connecticut Company Stops All Local Service—Buses Flock from Nearby Cities—Good Weather Assists Jitney Men

Bridgeport, Conn., has been without trolley service since 12:01 a.m. on July 26 because of the failure of a city ordinance restricting jitneys to stand the test of the State courts. The Connecticut Company had agreed to continue service pending the hearing on the jitney men's injunction, but after the injunction was sustained gave notice it would cease service Sunday night, which it did. Jitney and bus drivers from every city in the State flocked to Bridgeport during Sunday evening and night and for the first three days helped their Bridgeport brethren handle the crowds, rush and lean hour, and on fairly well regulated schedules. However, the human weakness element of such service is getting in its work. There were approximately 500 buses in service on Monday and Tuesday. On Wednesday some of the visiting jitneys had started home, and by Thursday it was stated that the number of buses was dwindling toward 300.

THERE is no doubt that the first two days of the week found Bridgeporters getting a good transportation service. The jitney men had voluntarily obligated themselves in their own association to maintain schedules and charge no more than 5 cents, and they lived up to their agreement. The rush-hour traffic was handled, but the state law that requires that a jitney shall carry only two more passengers than its designated seating capacity was smashed to smithereens in the supreme desire of the jitneys to make good. Notice from the state motor vehicle authorities that this provision must be enforced rigidly caused some dismay.

Jitney Rules Enforced

It was this dual problem of having to start on schedule whether the bus was filled or not, and to limit rush-hour loads to the legal requirement, that caused the jitney men of New Haven, Waterbury and Hartford to start back home Wednesday night. News of the situation from the jitney men's standpoint, coupled with the expense and difficulty of registration in Connecticut, was apparently the reason why the Massachusetts and New Jersey buses did not appear in the numbers anticipated.

The second day of the fair field for the motor bus saw many of the jitney men late. Buses being individually owned, each operator is his own ultimate boss, and those who had worked from twelve to sixteen hours on Monday were too tired to show up early on Tuesday morning. Attempts were made to work out a plan of having the jitney operators work in two shifts, but no definite arrangement had been announced on Thursday.

By Wednesday evening jitney men found that handling the rush-hour load was a strain under which they were breaking down and an appeal came to the business men of Bridgeport for the co-operation in the form of staggering the closing hours. John G. Schwartz, president of the Bridgeport Bus Association, said, "We do not propose to tell the business men or the manufacturers how to run their business, but it is a fact that we have received not one iota of co-operation from either of them in attempting to handle the transportation of the city thrust suddenly upon us." He then suggested certain staggered hours.

Buses Give Good Service

Street traffic under the jitney-bus-no-street-car transportation system has been satisfactory. The buses have been requested to hug the curb, allowing more rapidly moving private motor vehicles to use the middle of the street. Congestion and crowding have been less in many cases than with the electric cars. One traffic officer who commented on this said that every time a street car stopped forty or fifty motor vehicles would pile up behind it while it was unloading and loading, and then he would have a heavy traffic group to pass over his corner. With the buses he claimed greater flexibility and freedom, and that his traffic units came in smaller groups.

Very few complaints have been received from the public with reference to the buses, except that there have not been enough of them for rush-hour transportation. There has been overcrowding, and a few jitney operators have disobeyed the fare limit and charged 10 cents.

There is no intimation as to when or whether the Connecticut Company will resume service in Bridgeport. It was at first anticipated that the city would pass an ordinance in line with the suggestion contained in the decision of Judge Banks upholding the jitney men's injunction, but indications Thursday were that the company might not receive any further legislative help from the city. Unexplained orders in the carhouse of the Connecticut Company called the trainmen to duty on Saturday, July 31, to be assigned runs effective Aug. 2. The company has made no statement on this, but some of the trolley men say it merely means an extension of some shore service out of New Haven which runs into the Bridgeport division.

All Eyes on Bridgeport

The situation in Bridgeport is being watched closely by all of the other cities in the State, numbers of whom have held "town meetings," from which the various councils are trying to get opinions and data from which to base any possible jitney restricting legislation. On the whole the attitude of these meetings, as well as newspaper editorial comment over the State, has been that the electric rail service can not be dispensed with, and that it is only fair that the motor buses be placed under restrictions similar to those placed on the electric rail systems, or that they be restricted to service which is supplementary, or at least which is not actually competitive. In the comment of the same papers and of people who support the above arguments there was a well defined attitude that the Connecticut Company has taken an unwarrantedly drastic step in Bridgeport, and a step not in consonance with the attitude of Bridgeport expressed by its attempt to pass a restricting law. The criticism is that the Connecticut Company discontinued service before Bridgeport could possibly have enacted a legal ordinance without the Mayor's having called a second emergency meeting of the Council.

In Ansonia, Waterbury, Hartford and New Haven there was during the week a noticeable decrease in the number of jitneys operating, and this was attributed in one of the "town meetings" by one of the jitney men's representatives to the fact that the jitneys had gone to Bridgeport. This proved somewhat of a backfire in his argument as to the dependence the public should place upon the jitney service.

The experience of Bridgeport so far this week and the discussion in the other cities in Connecticut have failed to produce anything very conclusive as to the final outcome of the trolley-motor bus controversy in Connecticut, with the exception of a more or less well formed public sentiment as outlined above.

Seattle Increase Effective

Failure to file a referendum petition before noon on July 17 calling upon the City Council of Seattle, Wash., to submit to popular vote the proposition of increasing the fare on the lines of the Municipal Street Railway has caused the 10-cent cash fare to go into effect. Owing to the delays in manufacture of the 6½-cent tokens, the advanced fares did not become effective until July 24. During the thirty days that had elapsed since the bill was approved by Mayor Caldwell, petitions had been circulated asking for a referendum vote on the subject. Filing of such a petition would automatically have prevented the ordinance becoming a law until it was voted upon by the people.

The new fare tokens, providing for four rides for a quarter, have been placed on sale on all cars of the municipal lines, at the railway office, and on busy corners in various parts of the city. Nearly 500,000 tokens were sold the first day of their use. The tokens are to be sold on the cars permanently, according to the present plan. The new fare schedule provides for a cash fare for one of 10 cents; cash fare for two, 15 cents; four tokens for 25 cents; eight tokens for 50 cents; 16 tokens for $1. Transfers are issued on fares paid with cash or with tokens.

Birneys in Baltimore

One-Man Cars Making Good on 3.4-Mile Belt Line Around Business District—Many Transfer Points

Standard Birney cars were placed in operation on the Fremont Avenue route of the United Railways & Electric Company, Baltimore, Md., on July 1. The line is completely equipped with the new cars and they have proved very successful. The Fremont Avenue route skirts the congested center of the city, acting as a belt line around two sides of the business district. The route intersects and transfers to and from twenty-four of the important lines of the system on a run of 3.4 miles and has twenty-four compulsory stops, including twenty-two track intersections.

Heavy Transfer Interchange

The non-rush hour running time is twenty-four minutes each way, with twenty-six minutes for the rush hours, morning and night. There is rather heavy transfer interchange at many of the intersections, and hence it was felt that this route would give an "acid test" to the use of this type of rolling stock in Baltimore. The cars were purchased from the J. G. Brill Company and deliveries began during May.

Preparatory to operating cars, in order to provide as far as possible against delays and operating trouble, the track and overhead were gone over and put in good condition and two additional electric switches were installed to facilitate operations. There is a loop at one end of the line, but at the other end, where heavy loading is encountered during evening rush hours, it has been necessary to station a terminal man to help handle the cars and assist the operator. At certain points the stops were changed from "near side" to "far side" to minimize interference with other lines.

The newspapers were kept informed of the plans of the company and were afforded an opportunity to inspect the new cars and operating methods before the cars were actually put on for public use. When the time came, however, to put the cars on the street no special publicity was employed, outside of a news item in the paper. The entire service was changed over at one time.

Thorough Preparations Made

The company in 1919 began to study the possibilities of operating safety cars of the Birney one-man type. Careful investigation was made of installations already in operation. The officials of the company went over the matter on the ground in a number of different cities. They also had the benefit of the advice of the representatives of manufacturers who have been making a service and transportation study of this new car. An investigation was made of the different lines in the system, and it was finally decided to purchase thirty-three cars for the Fremont Avenue route.

Careful consideration was given to the standard safety car then being built for general use around the country. There were a number of things which the engineers of the company at Baltimore considered desirable to incorporate in the new cars, but it was found, due to quantity production methods of manufacture, that if the standard design was changed it would increase materially the expense of the cars and would slow down their delivery. Hence the standard Birney car was purchased without alterations in equipment or design.

Instruction for Operators

As soon as cars began to arrive from the builder they were operated on an unused stretch of track on off hours by the crews of the Fremont Avenue line. This line had previously had hand-brake single-truck cars on it, and the men had to be instructed in the use of the air brake, in addition to the other new devices on the new cars. Great care was taken to give these men sufficient time to qualify. Due to the frequent interchange of passengers it was particularly necessary to drill the motorman in handling transfers and fares. The pains and time given to this feature of the work were amply rewarded, because every man but one out of approximately fifty-one was able to qualify.

With the old equipment nine cars on the base schedule and twenty-one in rush hours provided the service, the car seating thirty, with a maximum allowed capacity of fifty-seven. In place of these a new schedule providing fourteen safety cars on the base and twenty-nine in the rush hours was started. The new service was augmented approximately 45 per cent over the old, as measured in car-miles per day. This service is better than any previously furnished on this route and has been of help to the company in gaining the co-operation and approval of the riders. Due to the short time the new equipment has been in service, it is not yet feasible to draw any conclusions as to operating or financial results.

Ten Cents in Tacoma

The State Public Service Commission in a decision handed down on July 27 ordered a 10-cent cash fare placed in effect on July 28 on the Tacoma, Wash., lines of the Tacoma Railway & Power Company and the Pacific Traction Company. The companies were ordered to sell tickets at the rate of twenty-five for $2. The new rates will remain in effect for a period of six months.

Provision was made in the commission's order that, should the city relieve the companies of the 2 per cent gross earnings tax, free transportation of policemen and other city employees, and from the terms of the franchises requiring the street paving, tickets are to be sold at the rate of fifteen for $1. The order, from all indications, presages a war between local jitney bus associations and the railways. Several members of the City Council are admittedly in favor of jitney operation under conditions of regulation.

City's Case Closed

Chicago Makes Final Appeal to Commission for 5-Cent Fare—Mayor Wants Safety Cars

Chester E. Cleveland, Mayor Thompson's special traction counselor, completed argument before the Illinois Public Utilities Commission last week in the effort of the city of Chicago to force a return to a 5-cent fare on the Chicago Surface Lines. The substance of the argument was that if that part of the contract between the city and the Surface Lines which specifies good service at a 5-cent fare is invalid, then the entire contract should be invalid. Or, if those portions of the contract which permit the company to operate on the streets and the city to share in the net proceeds to the extent of 55 per cent are valid, then that portion which specifies the 5-cent fare should be valid.

Mayor "Watches Step"

In view of this position, Mayor Thompson has vetoed ordinances permitting the extension of lines as provided under the 1907 contracts and has refused to accept the 55 per cent of the net proceeds which has been tendered to him by the Surface Lines, on advice of counsel that to do these things would put the city in the position of acquiescing in the validity of the contract, while it has taken the position that the contract was forfeited when the rate of fare was increased above 5 cents.

The city administration has sent out several representatives to various points in the country to make a hurried study of safety cars, presumably for the purpose of determining whether the Chicago companies should take advantage of the economies offered by this type of equipment and thereby make possible operation at a lower fare. The investigation by the city is being conducted through Mayor Thompson's traction commission, of which Corporation Counsel S. A. Ettelson is chairman.

R. F. Kelker, Jr., transportation supervisor for the city, was sent to Kansas City, Mo., to make a similar survey, and T. E. Flanigan, his assistant, was sent to Gary, Terre Haute and Fort Wayne, Ind.

Safety Cars Favored

While in Terre Haute Mr. Flanigan asked the opinion of Mayor Hunter on this type of equipment, and his Honor responded with the following statement.

> As Mayor of Terre Haute, and resident of Terre Haute for forty-eight years, I take great pleasure in recommending to any city in need of street car service the one-man cars. They have proven to be very satisfactory in Terre Haute, and the public would not care to change back to the old style. They are quick to stop and quick to start and no danger of anyone getting hurt by getting on and off the car, as the door does not open until the car stops, and the car does not start until the doors close. They don't seem to have any trouble in making change quick or issuing transfers. We have about fifty of them in operation in Terre Haute, and they are giving good satisfaction and good service and we have no complaints from the public.

Transportation News Notes

Town Council Authorizes Regulation of Buses.—The Town Council of Westerly, R. I., has authorized Chief of Police Thomas E. Brown to regulate the operation of buses in competition with the Shore Line Electric Railway from Westerly to Watch Hill and Pleasant View.

Fare Raise Unopposed.—An application of the Wallkill Transit Company, Middletown, N. Y., for permission to increase its fare from 5 cents to 7 cents was unopposed at a recent hearing before the Public Service Commission for the Second District. The company operates in Middletown and its suburbs.

Ten Cents Straight on Narrow Gage.—The Boston, Revere Beach & Lynn Railroad, Lynn, Mass., has received permission from the State Department of Public Utilities to charge a straight 10-cent fare on its narrow gage line in Winthrop. The sale of commutation tickets has been ordered discontinued.

Jitneurs Ordered from Streets.—Thirty-one jitney drivers of Bayonne, N. J., were ordered by the municipal authorities to cease operation on July 16. The jitney men had failed to comply with the provisions of a new State law requiring the filing of $5,000 bonds by all operators. Sixty-four jitney licenses are held in Bayonne.

Seven Cents in Halifax.—Halifax, N. S., is now paying a 7-cent fare. The Nova Scotia Legislature recently authorized the Nova Scotia Tramways & Power Company, Ltd., to raise its cash rate from 5 cents to 7 cents, and to sell tickets in books at the rate of seventeen for $1. Twenty workmen's tickets are sold for $1.

Six Cents in Danville.—The Board of Aldermen of Danville, Va., has passed an ordinance empowering the Danville Traction & Power Company to raise its fares from 5 cents to 6 cents. The City Council some time ago undertook an investigation of the local lines, with the view to the possibility of taking over the railway system.

I. C. C. Order Stands.—The Interstate Commerce Commission has refused to rescind its former action permitting the Washington, Baltimore & Annapolis Electric Railway to increase its one-way and round-trip fares between Washington and points in Maryland on that line. The new tariff became effective on July 11.

Would Charge More in Santa Barbara.—Application has been made to the California Railway Commission by the Santa Barbara & Suburban Railway, Santa Barbara, for permission to charge an 8-cent cash fare on its Santa Barbara lines. The company proposes to sell tickets at the rate of five for 35 cents and school tickets at the rate of 2½ cents each, in books of forty for $1. The company also seeks to raise the rate on its bus lines.

Higher Fare in Gulfport.—The Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., has been authorized by the municipal authorities of Biloxi, Gulfport and Pass Christian, Miss., to raise its fares on its lines in these cities from 6 cents to 7 cents in each zone. This company has granted its employees a wage increase to a scale of 40 to 50 cents an hour.

Wants Rise on Suburban Line.—Application has been made to the State Public Service Commission by the Wheeling (W. Va.) Traction Company for an increase in rates on its line between Weirton and Moundsville and intermediate points. Reasons for the proposed increase are the cost of fuel, labor, and all necessary materials for the maintenance of proper service.

Upholds Interstate Advance.—The Interstate Commerce Commission has issued an order permitting the Wheeling (W. Va.) Traction Company to raise the fares on its line to Steubenville, Brilliant, Bellaire and Martins Ferry, Ohio. The fare from Wheeling to Bellaire becomes 10 cents. The city of Martins Ferry has brought court action to oust the company from the city streets.

Fare Zones Rearranged.—The collection of fares based on a 2½-cent zone was discontinued on the lines of the Connecticut Company, New Haven, Conn., formerly operated by the Shore Line Electric Railway, Norwich, Conn., on July 15. The collection of fares is now based on 5-cent zones. At the same time the use of the Rooke cash register was discontinued. Overhead clock registers are now being used.

"Jay Walking" Banned in Knoxville.—"Jay walking" is now punishable as a misdemeanor in Knoxville, Tenn. An ordinance barring the practice throughout the city took effect on July 12. Under the terms of the new law pedestrians in crossing streets are required to move in the direction of vehicular traffic, and are forbidden to cross streets or highways except at the regularly designated crossings and then at right angles only.

Six Cents in Richmond.—An ordinance has been passed by the Common Council of Richmond, Va., authorizing the Virginia Railway & Power Company to charge a 6-cent fare on its lines in that city. The company is now charging a flat 5-cent fare. Its application to the city authorities for financial relief encountered little opposition.

Will Fight Scranton Increase.—City Solicitor Houck of Scranton, Pa., has been directed by the City Council to take steps to protest against the proposed increase in fare by the Scranton Railway from 7 cents to 10 cents. The city authorities have been urged to carry the case to the United States courts.

New Bus Law Proposed.—A new ordinance has been introduced in the City Council of Philadelphia, Pa., granting permission to the Philadelphia Transportation Company to operate motor buses on Broad Street from Olney Avenue to the Philadelphia Navy Yard. The ordinance specifies no fare rate. Mayor Moore recently vetoed a measure previously passed by the Council which would have empowered the bus company to operate at a 5-cent fare.

Interurban Raises Rates.—A new schedule of fares became effective on the line of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, between Youngstown and New Castle, Pa., on July 20. The rate between Youngstown and New Castle becomes 50 cents and between Youngstown and Lowellville 20 cents. An advance of 10 cents has been made from all points between Lowellville and New Castle to Youngstown.

Denies Jersey Increase.—The State Board of Public Utility Commissioners has dismissed the petition of the Atlantic Coast Electric Railway, Asbury Park, N. J., for permission to increase the present rate of fares from 6 to 8 cents in each of its zones. The board has signified its willingness to approve a 7-cent fare in each zone. The company operates in Asbury Park, Bradley Beach, Neptune City and adjacent municipalities along the New Jersey coast.

Wants Ticket for Workmen.—S. Wiley Wakeman, general manager of the Fore River Plant of the Bethlehem Shipbuilding Company, in a communication sent to Forrest I. Neal, chairman of the home rule committee of the Quincy Chamber of Commerce, urges a special workingman's ticket entitling the worker to a reduced fare on the Eastern Massachusetts Street Railway in Quincy. The railway has recently increased its fare about 33⅓ per cent on strip tickets and 100 per cent on straight fares.

Seeking Eight-Cent Fare in Bellaire.—Bellaire, Ohio, car riders after Sept. 1 next may be paying an 8-cent cash fare or 6⅔ cents for a ride on a ticket. In a communication to City Council C. P. Billings, general manager of the Wheeling Traction Company, says that a new rate schedule for fares has been filed with the Public Utilities Commission providing for those cash fares and ticket rates. The company is willing to accept the franchise passed by City Council recently, provided the rental clause is dropped and some minor changes made.

Hearing on Portland, Me., Fares.—The petition for a 9-cent ticket fare and 10-cent cash fare was the basis for a hearing on behalf of the Cumberland County Power & Light Company operating the Portland (Me.) Railroad, before the Public Utilities Commission. It was brought out that the deficit for the past year, so far, was $147,000. An additional burden, at least $100,000, would be occasioned on account of wage

increases granted by the board of arbitration. Judge Cleaves, chairman of the Commission, said that the company owed it to the public, as well as to the commission, to clear up the situation with respect to all rumors and intimations in connection with the financing of the company.

Hearings on California Rise.—Hearings on the application of the Pacific Electric Railway, Los Angeles, Cal., for a general increase in its rates began before the State Railroad Commission on July 15. An application of the city of Pasadena and other municipalities to have the petition dismissed was refused. The company introduced testimony tc show that it had been operating at a heavy loss, the total loss up to May 31 last having been $12,189,780. It was testified that the loss during 1919 was $2,767,726, and that in 1918 the loss was $1,778,191. It was further shown that wages for 1919 had been increased $2,621,162.

Ten Cents in Galesburg.—The Galesburg Railway, Lighting & Power Company, Galesburg, Ill., has been authorized by the Illinois Public Utilities Commission to increase its fares from 7 cents to 10 cents, and to sell ten tickets for 75 cents. The Danville (Ill.) Street Railway & Light Company has been authorized by the commission to increase its fares from 5 cents to 7 cents. The Tri-City Railway has been granted a 10-cent fare in Rock Island and Moline, Ill., and in adjacent towns to Moline. The commission has issued an order continuing in effect the 6-cent fare now being charged by the Kankakee Electric Railway on its lines.

Eight Cents in Rock Island.—Eight-cent fares went into effect on July 20 on the Rock Island, Moline, East Moline and Silvio, Ill., lines of the Tri-City Railway. The increase from the former 7-cent rate was authorized as an emergency measure by the State Public Utilities Commission, pending action on the company's petition for permission to install a permanent fare of 10 cents on its Illinois lines. By the terms of the commission's order the fare for children less than twelve years of age becomes 4 cents. The company recently raised the wages of its employees from 60 cents to 70 cents an hour.

Wants Higher Rates Continued.—Argument was started on July 22 before the Interstate Commerce Commission on the application of the Hudson & Manhattan Railroad, New York, N. Y., to make permanent the temporary fare schedule of 10 cents uptown and 6 cents downtown, which has been in force for several months in the tubes between the city of New York and New Jersey communities. James C. Carmalt, counsel for the railroad, declared the increase in fares was necessary if the company was to continue to pay the interest on its bonds, which amount to about $79,000,000. As an alternative, he said, the company was willing to fix a flat rate of 8 cents.

Eight Cents in East St. Louis.—The Illinois Public Utilities Commission on July 23 authorized the East St. Louis & Suburban Railway, East St. Louis, Ill., to increase its fare from 6 cents to 8 cents effective July 26, to provide additional revenue necessary to meet the recent wage award. The company had petitioned for a 10-cent fare. The commission in entering the order stated that a 6-cent fare would be confiscatory and a 7-cent fare would not meet operating expenses and pay a fair return on the lowest estimated value of the company's property. The 8-cent fare is the only solution to the present high cost of operation.

Commission's Rate Authority Upheld.—Justice Curran has dismissed with costs the case of the city of Winnipeg vs. the Winnipeg (Man.) Electric Railway, challenging the right of the company to increase fares fixed by contract. This decision was reached on the grounds that the court of King's bench is without jurisdiction to question the validity of an order made by the Public Utilities Commissioner. Judge Curran rules that the Public Utilities act is constitutional and wholly within the legislative authority of the province to enact, but while it constitutes the Public Utilities Commission a court of record, it does not make it a superior court.

Commends Bluefield Service.—Following receipt of the report of W. B. Hall, assistant engineer of the State Public Service Commission, on an investigation of the complaint of the city of Bluefield, W. Va., of inadequate service furnished by the electric railway lines of the Appalachian Power Company, City Attorney John R. Dillard has asked for a public hearing. Mr. Hall reported that the car supply is adequate for the transportation of passengers within the corporate limits of Bluefield; that conductors and motormen on all cars were giving very good service considering their experience, and that while some of the cars were old and needed painting badly and a few minor repairs, as a whole the city is better equipped and is receiving better service than many cities of the same size.

Asks More on Bus Lines.—Following the application of the Pacific Electric Railway to the California Railroad Commission for an increase in its passenger and freight rates, auto stage lines operating out of Los Angeles to all points in Southern California, as well as operating between Los Angeles and San Francisco and way points, have applied to the State Railroad Commission to increase their fares. The Railroad Commission controls the regulation of these auto stage lines as to rates of fare, operating schedules and routes. Exhibits filed by the Motor Transit Company, operating the bus lines, show that its total operating expenses for January, February and March, 1920, were $281,245, while its revenue from all sources was $253,350. The number of passengers carried for this three-month period totaled 561,721 and the car-miles operated amounted to 1,401,764.

Motor Bus Regulation in St. Louis.—The Board of Aldermen on June 29 passed a motor bus bill providing that companies operating motor buses in St. Louis, Mo., must pay an annual license of $25 per bus, and must pay into the city treasury 3 per cent of their gross receipts. The measure fixes the maximum fare as 10 cents, requires that each company give a bond of $10,000 to the city and puts bus schedules under the regulation of the Board of Public Service. A fine of from $25 to $500 is fixed for the violation of any of the terms of the bill. Outside of the municipal buses operated in Forest Park, the only buses being operated in St. Louis are the eleven of the Missouri Bus Company, which run on fixed schedules between Sixth and Locust Streets and Delmar and Hamilton Avenues.

May Raise Rates Again.—Unless the books of the Cincinnati (Ohio) Traction. Company show a gain in receipts for the month of July there will be an increase in fare of ½ cent, making the rate 8 cents flat on Sept. 1. Despite the fact that the fare was raised to 7½ cents by ticket or 8 cents cash on June 1, there was a deficit for June of $13,601. Under the terms of the franchise, when the receipts are less than the operating cost for any two calendar months, the fare may be raised ½ cent, provided fifteen days' notice of the fact is given previous to the day on which the proposed increase becomes effective. This notice will likely be given to the patrons of the company Aug. 15. The operating revenues of the company for June, according to its report, were $763,871. Operating expenses for the same period were $507,-401. Rentals, taxes and sinking fund and interest charges, the report shows, made the total expenditure in excess of the receipts. For the six months ended June 30 there was a deficit of $141,108.

Commission's Power Upheld.—Restrictions on the powers of the cities of Utah, imposed by the public utilities law, to control by franchise utilities operating within their boundaries, were defined by the Supreme Court of Utah in deciding the case of Murray City against the Utah Light & Traction Company and the Utah Power & Light Company. The suit was brought by Murray to test the legality of the Public Utilities Commission's ruling with regard to zone systems, the order of the commission being in violation of the Murray franchise. It was alleged by the city that, in the matter of fares and zones, and also in various other particulars, with regard to the repair and grading of tracks and crossings, the franchise had been violated by the traction company. The court points out that in a similar case it held that the State, by reason of its right as a sovereign, retained the power to modify or annul a rate or fixed charge for services rendered by a public utilities, and that any order made by such a commission is a regular and binding order.

Personal Mention

Rochester's New Director

C. R. Barnes, Who Will Manage Local Lines, Will Have Wide Powers—Takes Office Aug. 1

The appointment of Charles R. Barnes, electrical expert for the Public Service Commission of the Second District to be the first Commissioner of Railways of Rochester, N. Y., was announced by Mayor Edgerton on July 20. The selection of Mr. Barnes to supervise the operation of the lines, in the interest of the city, under the new "service-at-cost" plan approved by the Mayor and the Common Council for the local division of the New York State Railways was noted in the ELECTRIC RAILWAY JOURNAL for July 24.

As Commissioner of Railways Mr. Barnes will have the duty of enforcing the ten-year temporary contract, which supplants the old agreement with the company. As the arbiter of disputed questions as to the character of the service he will fix the rate of fare and will determine the character and scope of the alterations and improvements to be made. No claims for damages against the company involving an expenditure of more than $100 will be settled without his consent. In short, he will be responsible to the city for the character of the service.



C. R. BARNES

Mr. Barnes is familiar with the operation of the Rochester railway system. As expert for the Public Service Commission, he has made many studies of the problems there and most of the betterments made in recent years have been in accordance with his suggestions. Operation of the lines under Mr. Barnes's direction will begin on Aug. 1. The fare will be 7 cents until Mr. Barnes is able to show earnings enough to decrease it, or, on the other hand, he may be constrained to raise the fare.

Mr. Barnes was born near Spencerport, N. Y., in 1853. He entered the employ of the New York Central Railroad when a boy. He was telegraph operator at the Spencerport village station for four years and then was appointed ticket agent and freight agent for the Rochester & State Line Railroad, now the Buffalo, Rochester & Pittsburgh Railroad. In 1880 he became superintendent of the fire-alarm telegraph office for the city and held that post until 1898, when he resigned to become electrical expert for the State Railroad Commission. Later this body was merged into the Public Service Commission, but Mr. Barnes retained his post.

W. A. Dempsey has been elected vice-president of the Huntington (N. Y.) Traction Company.

Henry A. Murphy has been elected secretary of the Huntington (N. Y.) Traction Company.

C. P. Westlake has been appointed supervisor of equipment of the Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, N. Y.

C. V. Peeling, who resigned some time ago as manager of the Cornwall Street Railway, Light & Power Company, Cornwall, Ont., has become connected with the Palmetto Power & Light Company, Florence, S. C.

Edward T. Dempsey has been elected president of the Huntington (N. Y.) Traction Company, organized to take over and operate the lines of the defunct Huntington Railroad.

Russell G. Carter, Belfast, has been appointed superintendent of the Belfast district of the Penobscot Bay Electric Company, a subsidiary of Maine Power Company, to succeed H. P. Blodgett, who has been transferred to the Rockland District.

Bryant White has succeeded Graham Claytor as general superintendent of the light and power departments of the Roanoke Railway & Electric Company, Roanoke, Va. Mr. White was formerly a power engineer in the employ of the Public Service Electric Company, Newark, N. J.

John F. Stevens, a trustee of the Boston (Mass.) Elevated Railway, has been made president of the newly organized Hyde Park Transportation Department, formed to take over and operate on behalf of the city of Boston the Hyde Park lines of the Eastern Massachusetts Street Railway.

Charles D. O'Donnell, who was recently appointed superintendent of the Southbridge division of the Worchester (Mass.) Consolidated Street Railway, was presented by his friends with a gold watch and fob on July 16.

Will Run City's Lines

Joseph S. Goodwin Named General Manager of Detroit's New Municipal Railway

Joseph S. Goodwin, formerly manager of the Bridgeport (Conn.) lines of the Connecticut Company, has been selected for the position of general manager of the Detroit (Mich.) Municipal Railway, the personnel of which is now being organized for the construction and operation of city-owned lines under the terms of the municipal bond issue approved by the voters of Detroit at an election on April 5. The plans sanctioned by the voters call for the construction of 101 miles of new track and for the equipping of this trackage with 400 motor cars and 150 trailers, as well as for the taking over of 55.5 miles of line now being operated by the Detroit United Railway. The total trackage provided for the city system is 156.5 miles of north and south and crosstown lines, with two routes open to the heart of the city.

Since resigning his position with the Connecticut Company early last June, Mr. Goodwin has been associated with the firm of Charles E. Morse, Inc., of Boston, with headquarters in Hartford, Conn. Mr. Goodwin was born in Beverly, Mass., in 1877. He entered railway work in 1895 as a motorman on the Gloucester, Essex & Beverly Street Railway, now a part of the Eastern Massachusetts Street Railway system. He was subsequently employed as a motorman for a short time by the Rhode Island Company, Providence, R. I.



J. S. GOODWIN

In 1901 Mr. Goodwin entered the employ of the Hartford & Springfield Street Railway, Warehouse Point, Conn., as a motorman. He was later appointed a dispatcher of the company. In 1906 he was advanced to the position of chief dispatcher and served in that capacity until February, 1914, when he was made secretary and superintendent of the system. He was subsequently made general manager of the company. Three years ago he resigned to become manager of the Bridgeport lines of the Connecticut Company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Strong Market for Asbestos Insulating Material

Electric Railways Ordering in Larger Quantities—Deliveries Fair in Spite of Raw Material Shortage

Asbestos products as used in electric insulation are in such shape as to induce an optimistic view of the situation, according to inquiries instituted in this field. Demand for this material at present is not only strong but is increasing. Most of the call is for repair work purposes, with central stations the strongest buyers, although electric railways are now buying better than has been the case during the past three or four years.

Deliveries are in pretty fair shape, and although transportation difficulties for asbestos producers have as yet given no evidence of easing up, on the item of asbestos board, for instance, deliveries can be made on large orders in about thirty days.

Production at present is said to be above normal, in spite of the fact that some shortage of raw material is experienced, which again is induced by the freight situation rather than because of an actual scarcity of raw material. Even here the situation is not characterized as "bad." The cost of asbestos fiber is very high, however, and bids fair to go still higher.

Prices on the finished material are ruling strong, with a tendency apparently to increase if any change comes about.

Increasing Foreign Demand for Trolley Line Material

Domestic Buying for Maintenance Work Only—Shortage of Castings Lengthening Deliveries as Prices Stiffen

Domestic activity in the field of overhead trolley line material is not especially marked, although orders for maintenance work are in fair volume. This demand, however, is more or less spasmodic. In some quarters it is said that inquiries are increasing, but electric railways are closely watching their actual needs for ears, hangers, crossings, splicers, etc., and little or no new construction work of this sort enters the market. Foreign demand seems to be picking up, however, rather active markets being reported in South America, Mexico and Switzerland, Australia and New Zealand.

Delivery quotations show a wide variance, several producers quoting from four to eight weeks. One company is in a position to ship in about ten days, with delivery up to the railroads; still another producer touches the opposite extreme in being unable to promise delivery under three to four months. Reasons given for these delays cover a wide range; in the case of some manufacturers it is raw material with a dearth of castings that is impeding production, and with others, who report a normal output with no labor troubles, embargoes are given as the cause of delay.

In the majority of cases stocks of finished goods are rather flat, but here and there a condition characterized as "good" or "fair" can be found. General price increases ranging from 6 to 15 per cent came into effect on July 1, but the higher price level apparently caused no orders to be canceled. Present demands are for the most part really to satisfy the most urgent needs. Collections on sales of this material are reported at this time in a favorable condition.

Current Fuel Needs of Utilities Secured

Regional Priorities Act Virtually as an Embargo on Coal Exports —Home Competition and Foreign Buying Tend to Force Prices Up

Relief may be expected in the coal situation now that the Department of Justice, the Interstate Commerce Commission and the Senate special committee on reconstruction are all devoting their attention to it. The three parties are attacking the problem from independent angles in accordance with their respective power to act, *i e.*, prices, transportation and legislation.

Evidence introduced at recent hearings indicates that the present situation is critical. A shortage of coal stocks and of coal cars had to be faced by the coal producers and users. The mine owners contract for only a percentage of their output and sell the rest on the open market; the large consumers contract for an excess tonnage to secure a storage supply and to make sure of sufficient deliveries. When a shortage of cars and of production occurs, the mine owners reduce both the coal supplied on contracts and also the spot coal.

Elements Tending to Increase Price

When the contract coal users do not receive their full quota of coal they go into the open market and try to get the spot or free coal under competitive price conditions. This competition forces prices up and a further element in increasing the prices is introduced by the fact that foreign countries are in the market for coal at any price, and also that some dealers and speculators have manipulated markets by reconsigning coal cars until conditions were tight.

John W. Lieb, vice-president of the New York Edison Company, in his testimony before the Senate committee on reconstruction gave a good picture of the situation for his specific case. The Edison and affiliated companies have a coal contract for the year which includes all the coal to be used and a storage of about 250,000 tons. The prices on this contract coal run from $4.25 to $4.75 at the mine. Since Aug. 1, 1919, the "contract" coal received was only about 52 per cent of the contracted amount, with the result that the companies went into the market and purchased "free" coal at an average price of $10 per ton. The companies were thus compelled to purchase about 30 per cent of their coal in the open market or quit business. As these companies use about 4,000,000 tons per year this means, on a 30 per cent basis, that they are paying about $7,000,000 a year more for coal than they would need to pay if conditions were such as to permit contract deliveries.

Labor Making New Claims

Another element in the situation is now appearing and that is labor. The previous wage adjustments were made on a normal coal price basis, and now that the men see the high prices obtained for "free" coal they are claiming a share in the extraordinary profits. The operators, however, say the wage scale was fixed by the government for a year and they cannot change it. The result has been a strike of laborers in Illinois, Indiana and Ohio, which only further decreases production and boosts the price of free coal.

The Interstate Commerce Commission has ordered all open cars to the mines and has given priority on assignments to public utilities and to certain geographical sections, particularly New England and the Northwest. This will relieve the situation for the utilities as regards their day-to-day consumption but will not permit any reserve storage for emergency conditions. It does, at the same time, amount to what is virtually an embargo on coal exports, besides an emergency use of rail equipment and a very decided increase in coal production.

A decrease in coal prices need only to be expected when there is either a

greater supply on the market or a smaller demand from consumers. The fact that there are no reserve stocks of domestic coal, combined with a nation wide propaganda, encouraged by government bureaus and coal operators, to the effect that there is a coal shortage, has created an almost hysterical demand for coal. The situation should be very much improved in the next thirty days due to the recent orders of the Interstate Commerce Commission.

Transformer Market Continues in Active State

Raw Material Stocks Fair — Power Transformers Quoted on Five to Eight Months Shipments

Transformer manufacturing plants are busy filling back orders and taking on new business, although some diminution is noted in the volume of inquiries and extent of so-called proposition work, compared with earlier in the year. Not much difference can be seen in the character of buying, both power and distribution transformers being sought in about the same proportions. The passage of the national water-power act has opened the door to larger sales, sure to be realized more and more as these resources are developed. As yet it is too early for this legislation to exert a substantial effect on orders, but considerable business is looked for from Western sources as projects long imprisoned on paper are released for construction.

Materials Situation Shows Improvement

An improved material situation as regards the heavier items used in transformer manufacture features present conditions. Manufacturers are less worried today over the supply of copper, magnetic steel and sheet iron than during the past winter. Railroad congestion has given cause for anxiety all through the year, but by strenuous efforts necessary stocks of the foregoing raw material have been accumulated in sufficient amount to permit steady production to be assured for some time. The chief difficulty has come in connection with the supply of such items as long-fiber cotton, shellac, enameled wire for primary coils, porcelain and grain alcohol.

Difficulties still exist in connection with the cotton supply, these being heightened by the large purchases of this material by the automobile industry. It has become necessary, in some cases at least, to buy shellac abroad before shipment to the United States in order to forestall complete absorption of imports on arrival. Facilities for local manufacture of enameled wire and porcelain will soon be established in at least one representative transformer-making plant, so that these materials will cause less trouble in future from the shortage standpoint.

Deliveries of distribution transformers now average about eighteen weeks, although occasionally much shorter shipments can be made. On power transformers classed as 200 kva. and over shipment can be made in from five to eight months. There are practically no factory stocks in hand of either type. Labor conditions are fairly steady and prices have been quiet but firm since the last advances, which took place in the late winter and in the spring.

Every effort is being made through quantity production and by pushing the standardization program to hold prices close to present levels, which are still far below the advances attained in many other lines of commodities. If pig iron advances further this summer, it seems likely that transformer prices may have to undergo another upward readjustment, but there is little certainty at present about this. A bright spot in this branch of the industry is found in the results of rating standardization, which have cut the sale of specials to one-third that of four years ago and reduced the number of standards to about 40 per cent of the old figures.

Long Island Car Purchase in Abeyance

Decision of Public Service Commission on Application for Increased Rates Will Affect Purchase of 100 Cars

On Aug. 2 the Public Service Commission, First District, will hold a hearing to pass upon the application of the Long Island Railroad for an increase in passenger rates. Involved in the outcome of the proceedings is the fate of 100 new passenger cars which the commission recently urged the Long Island Railroad to buy in order to care for growing passenger traffic. Replying to the request of the commission for the immediate purchase of these cars, in order to insure delivery by the summer of 1921, President Ralph Peters of the Long Island Railroad said that the financial ability of the company to pay for the cars depended upon its ability to earn the interest on the money which must be borrowed to purchase this rolling stock. As the likelihood of earning sufficient capital to meet the interest in turn depends upon the railroad's application for increased rates being granted, the hearing on Aug. 2 will have a special significance.

President Peters estimated that 100 new cars at present prices would cost about $3,000,000. This is the second installment of cars which the Public Service Commission has requested the Long Island Railroad to buy. Nearly a year ago the first notification was followed by contracts being placed for 100 passenger cars, apportioned between two builders in amounts of seventy and thirty cars. These were ordered in December, 1919, and delivery was supposed to be made in time to meet the summer traffic of 1920. Up to a recent date but two of these cars had been delivered, with eight more reported on the way.

Rolling Stock

The city commissioners of Calgary, Alberta, Canada, decided to call for bids on sixteen new motors for cars of the Calgary Municipal Railway.

The Springfield (Mo.) Traction Company is expecting shipment shortly of eight safety cars from the Cincinnati Car Company.

The Laconia (N. H.) Street Railway Company has purchased two safety cars from the Wason Car Company of Springfield, Mass., and delivery of the cars has been made.

Eastern Massachusetts Street Railway, Boston, Mass., lost twenty electric cars recently in a fire which swept the car barns at North Abington and destroyed four buildings. The total damage is estimated at about $75,000. Included among the cars which burned were nine of the double-truck type, three small cars, a sand car, flat car, a line wrecker and five snow plows.

The Burlington (Vt.) Traction Company is putting into operation two new 18-ton pay-as-you-enter cars, purchased from the government, which had intended them for use in transporting shipyard workers. The cost will be $10,500 each, but certain necessary modifications of the cars will raise this amount to $12,000 each. Seats are provided for sixty passengers.

Franchises

Portland Railway, Light & Power Company, Portland, Ore.—Franchises have been granted by the city and county for the construction and operation of the line on Jersey and Emerson Streets and proceedings have been started to widen the county road to 70 ft. Application will be made to the Public Service Commission to require the Portland Railway, Light & Power Company to operate the line as a part of the city's traction system. The length of the extension is approximately 1 mile and the cost will approximate $35,000.

Track and Roadway

Alabama Power Company, Birmingham, Ala.—A survey is to be made of the car line of the Alabama Power Company in Gadsden to determine what improvements will be found necessary.

Pacific Electric Railway, Los Angeles, Cal.—Plans are under way for the construction by the Pacific Electric Railway of a line to Sylvan Park and the University of Redlands. The line will run up Brockton Avenue to University Street and then down to Colton Avenue. The work, it is estimated, will cost about $7,000.

Los Angeles (Cal.) Railway.—Work on extending the electric line to Holly-

wood has been started by the Los Angeles Railway. One-half mile of double track will be laid to connect with the present Western Avenue line. This new improvement will cost about $50,000 and is part of the extensive program of $150,000 which the Los Angeles Railway has under way.

Palmer, Mass.—The street railway company of Palmer, which is part of the Springfield Street Railway Company, is relaying its track on North Main Street in preparation for the cement roadway which is expected to be built this summer.

Detroit (Mich.) United Railway.—The Detroit United Railway plans an extensive construction program in Flint and Pontiac, Mich., for this year. The work in Flint comprises 10½ miles of track and in Pontiac it comprises about 6 miles of single track.

Interborough Rapid Transit Company, New York, N. Y.—The Powers-Kennedy Company was the lowest bidder for the construction of column foundations and embankment for storage yards for the Brooklyn service of the Interborough Rapid Transit Company. Bids were opened July 19 by Transit Construction Commissioner John H. Delaney. Seven contractors submitted bids, the lowest bid being $407,000. In the steel construction for the same storage yard there were five bids submitted, the lowest being that of Bigelow & Nicholas for $387,400. This yard will be one of the largest in the transit system. The steel construction must be completed within eight months and the column foundations within eighteen months.

Power Houses, Shops and Buildings

Los Angeles (Cal.) Railway.—Two new rotary converters will be installed at one of the main downtown substations. This will approximate an expenditure of $65,000.

Toledo Railways & Light Company, Toledo, Ohio.—The Toledo Railways & Light Company has closed contracts for the construction of a high-tension transmission line belting the city of Toledo and adjoining that of the Toledo Terminal Railroad. The cost of this work will be approximately $1,000,000. The matter of preparing plans and securing right-of-way has been in progress for almost a year.

Interborough Rapid Transit Company, New York, N. Y.—A new subway station in Forty-second Street, between Fifth and Sixth Avenues, is planned as part of the Queensboro extension. The Forty-second Street Property Owners' & Merchants' Association is pushing forward this project, which will mean a line running west from Park Avenue. It will afford a connection with the west side subway and with the B. R. T. The station will have entrances at the east and west end, that is, one near Fifth Avenue and the other near Sixth Avenue.

Professional Note

The California Engineering Company, consulting civil, mechanical, electrical, hydraulic and marine engineer, announces the opening of its offices at 131 Leidesdorff Street, San Francisco, Cal. Paul B. McKee is president of the company: Paul R. Parker, vice-president and chief engineer, and Byron H. Hurd secretary.

Trade Notes

The Bussman Manufacturing Company, St. Louis, Mo., has purchased the fuse department of the Appleton Electric Company, Chicago.

The Economy Electric Devices Company, Old Colony Building, Chicago, announces that the Grayson Railway Supply Company, St. Louis, Mo., has been made its representative in the southwest territory.

Herman L. Wittstein, recently works manager of the Chapman Valve Manufacturing Company, Springfield, Mass., has been appointed production manager of the Morris Metal Products Company, Bridgeport, Conn.

The Locke Insulator Manufacturing Company, Victor, N. Y., announces the resignation of B. A. Plimpton as sales manager, effective Aug. 15. D. H. Osborne is serving as acting sales manager.

The National Carbon Company of Cleveland and San Francisco has recently increased the scope and efficiency of the Columbia data sheet service for users of motors and generators in regard to correct brushes for thes machines.

The Stoker Manufacturers' Association announces the appointment of the following officers and executive committee at a meeting held recently at Lakewood, N. J.: Sanford Riley, president; M. Alpern, vice-president; A. C. Pratt, treasurer; S. A. Armstrong, H. A. Hatton, and J. G. Worker, secretary.

The Indiana Service Corporation, Fort Wayne, Ind., formerly called the Fort Wayne & Northern Indiana Traction Company, has placed an order with the Economy Electric Devices Company, Chicago, for Economy meters for a complete installation on the remainder of its interurban cars. The Fort Wayne-Decatur division has been equipped for about a year.

The Gate Coil Company, Boston, Mass., has acquired property and a factory on Willard Avenue, Providence, which is to be remodeled for the manufacture of electric coil-winding machinery. The company is a subsidiary of the Universal Winding Company, Providence, R. I., and is capitalized at $100,000. Robert A. Leeson, 95 South Street, Boston, is president, and Frank N. French is treasurer.

The Blaw-Knox Company announces a change in the name of Hoboken, Pa., the home of the Blaw-Knox Company, to Blawnox. The Blaw-Knox Company was first established in Hoboken, Pa., about five years ago, at the same time operating another plant at Wheatland, Pa. About two years ago the latter plant was removed and added to the Hoboken works, which has since been enlarged.

The American Jobbers' Supply Company, Woolworth Building, New York City, as the Eastern associated company of the Joslyn Manufacturing & Supply Company, Chicago, has taken over the exclusive sale in the East of the Lindsley Brothers Company, producer and distributor of Western red and Northern white cedar poles. R. D. Patterson, formerly Eastern representative of the Lindsley Brothers Company, is now associated with the American Jobbers' Supply Company.

The Roller-Smith Company, 233 Broadway, New York City, announces certain recent changes in its sales organization as follows: G. L. Crosby, previously sales manager, is now general sales manager at New York City; M. Frankel, previously assistant sales manager, is now Western sales manager at Chicago; W. J. Shire, previously a sales engineer, is now Eastern sales manager at New York City; C. G. Kahant, previously a sales engineer, is now export manager and district sales manager at New York City. F. R. Ryan, J. E. Wood and H. D. Baker remain district sales managers respectively of the Chicago, Cleveland and Detroit territories. In addition to the above C. M. Hunt is a sales engineer in the New York office, and M. B. Mathley is a sales engineer in the Chicago office.

New Advertising Literature

Switching Apparatus.—The Union Switch & Signal Company, Swissdale, Pa., has issued bulletin 93, describing its style "M" electric switch movement.

Arc Welding.—The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is distributing reprint No. 85, entitled "Analysis of Arc Welding Principles and Processes."

Wood Preserver.—The C-A-Wood Preserver Company, St. Louis, Mo., is getting out a series of letters, which will be continued, on the preservation of timber, poles, etc.

Ball Bearings.—The Fafnir Bearing Company, New Britain, Conn., has published booklet No. 20 covering its ball bearings for electrically driven and other machines.

Controllers.—The National Electric Controller Company, Chicago, is distributing price list No. 10, descriptive of National controllers, etc.

Condulets.—Crouse-Hinds Company, Syracuse, N. Y., is circulating bulletin No. 1000N, on "Condulets, Mogul Obround Series."

Machine-Tool Control.—The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has issued a forty-eight page book, entitled "Machine Tool Control—C-H Controller."

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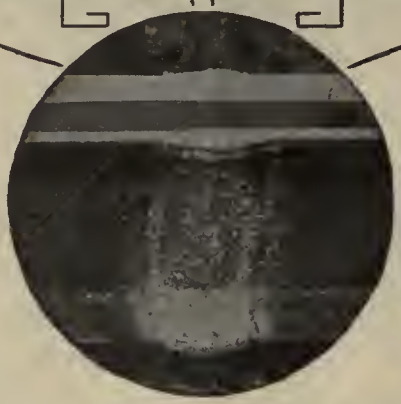
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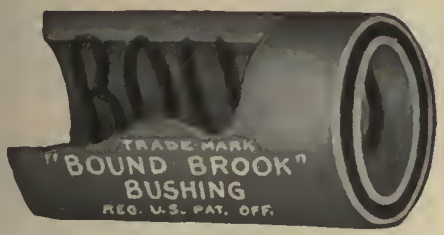




On the bearing surfaces of a Bound Brook Type bushing there are cast symmetrical grooves or trenches, varying in design according to the service for which the bushing is intended.

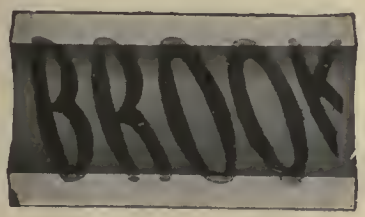
By means of hydraulic pressure these grooves are packed solid with a special, fine, hard lubricating graphite.

It's this graphite that makes Bound Brook Oil-less Bushings possible. Fine particles of it are distributed over the entire bearing surface, providing ample lubrication.



Trolley wheels fitted with Bound Brook bushings require absolutely no attention. Regardless of the speed of revolution they provide perfect lubrication and will never heat. There is enough graphite to last during the complete life of the bushing—and the mileage is well over 25,000 miles.

For efficiency, economy and long life, Bound Brook Trolley wheel bushings have no equal.



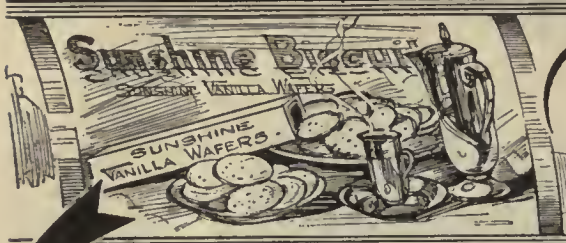
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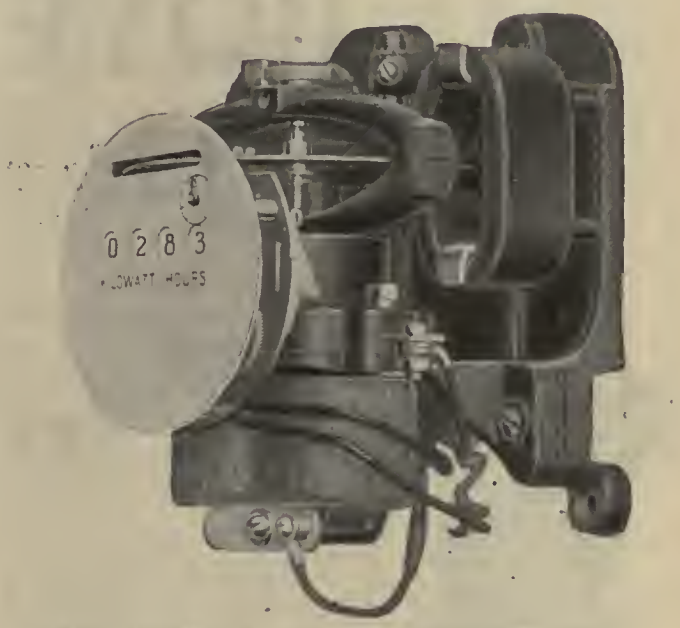
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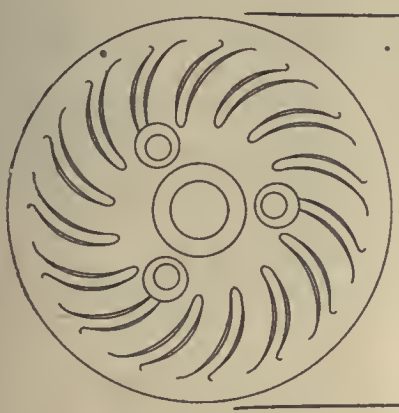
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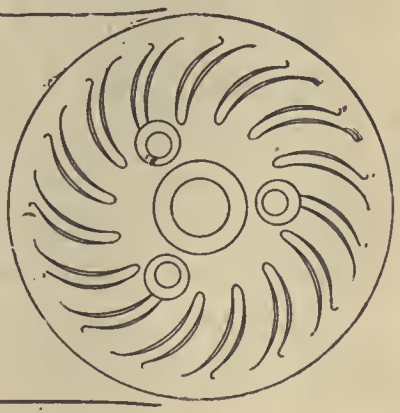
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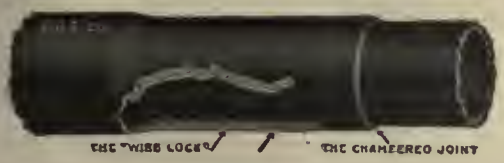
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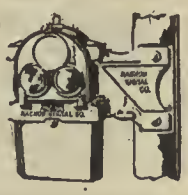
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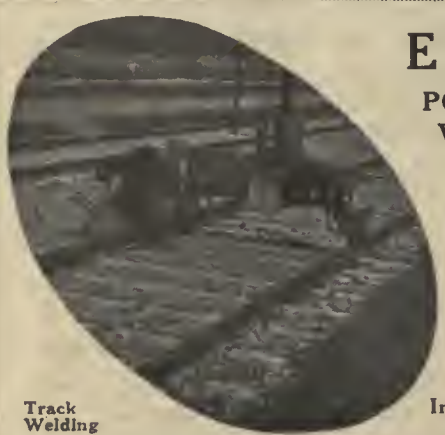
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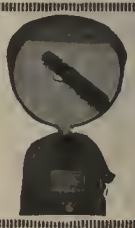
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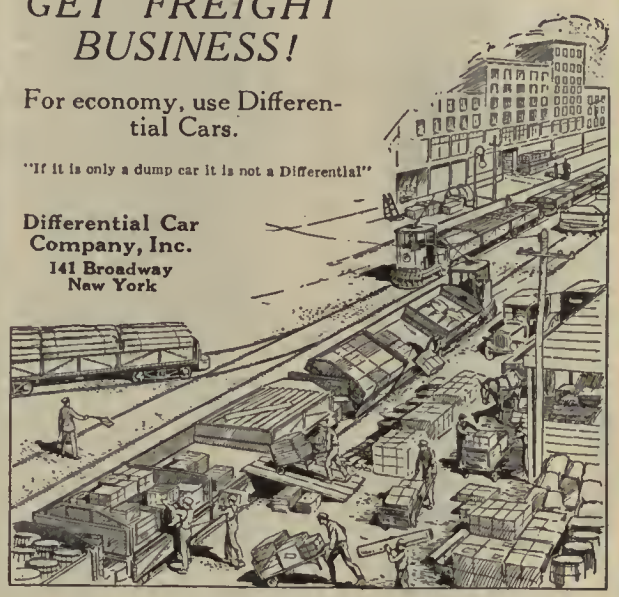
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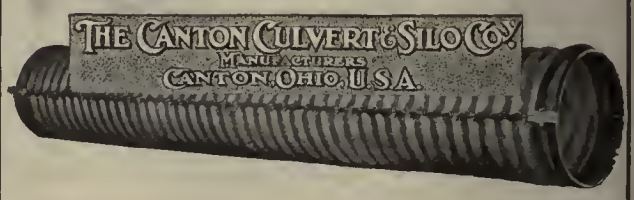
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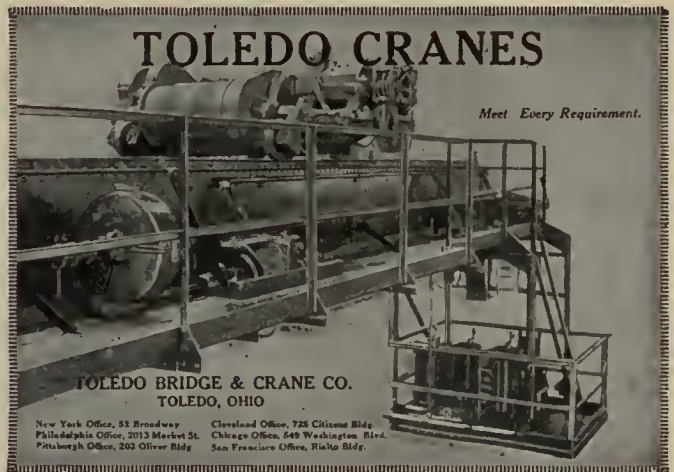
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BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
Alliance, Ohio



Williams' Superior Drop-Forged "C" Clamps

"THEY STAND THE STRAIN"

SELECT the clamp best adapted to your needs—"There's a Williams' Clamp for every purpose."
Williams' "Vulcan"—for Heavy Service—11 sizes, ¾ to 12½ inches.
Williams' "Agrippa"—for Medium Service—7 sizes, 4 to 18 inches.
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Machinists' Tools Booklet on request.

J. H. Williams & Co.

"The Drop-Forging People"

Brooklyn—Buffalo—Chicago

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

SEARCHLIGHT SERVICE

SECURES SATISFACTORY SITUATIONS SALES

816

162 RAILROADS USE DIXIE CUP Penny Vending Machines

To Solve their Drinking Cup Problems in Cars and Stations

INDIVIDUAL DRINKING CUP COMPANY, Inc.
HUGH MOORE, President
Original Makers of the Paper Cup — 220-230 W. 15th Street New York



Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.

ALBANY, NEW YORK, CHICAGO

"UNION" FUSES

"Union" Renewable Fuses will save four-fifths of your fuse maintenance cost. Guaranteed to give satisfaction. Money back if they fail. Booklet on request.

CHICAGO FUSE MFG. CO.
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BAKELITE-DILECTO

The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods.
The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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Branch Offices:
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FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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for
Railroads - Contractors - Industries
Automobiles - Pole Pulling and Ordnance

Templeton, Kenly & Co., Ltd.

Established 1899
London Chicago Paris

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SAFETY BUSH TOOLS

Make
HOT WIRE WORK
SAFE AND SURE
Write for Bulletin A
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6654 Broadway, Cleveland, Ohio

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The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



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KALAMAZOO, MICH., U. S. A.

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CARBON—GRAPHITE—METAL BRUSHES

For Car and Power House Units

MEXICAN GRAPHITE CURVE GREASE
For Gears of Electric Cars
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Largest Miners of Graphite on This Continent

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Type R-10
Single Register

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

The International Register Co.
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Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
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"It Behooves You to Hooverize Your Motormen"

We can help you
Write to
The Arthur Power-Saving Recorder Co.
2nd National Bank Bldg., New Haven, Conn.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

Heating and Ventilating

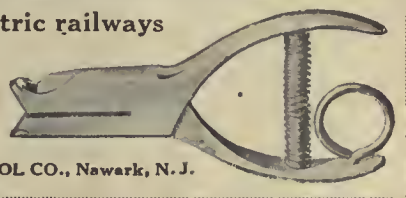
Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
Carlisle, Pa.

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H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents

75% of the electric railways use
B-V Punches



Send for Catalog.
BONNEY-VEHSLAGE TOOL CO., Newark, N. J.

Tickets and Cash Fares
The CLEVELAND
accommodates both
The Cleveland Fare Box Company
Cleveland, Ohio
Canadian Branch: Preston, Ontario.

DO YOU WANT A SALESMAN OR OTHER ASSISTANT?

If so, put an advertisement under "Positions Vacant" in the Searchlight Section. The result will be both quick and satisfactory.

Get YOUR Wants Into the Searchlight

62

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents. **payable in advance.**

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

ARMATURE winder wanted on railway motor and compressor armatures; experience on bar wound as well as coil wound armature desirable; good wages; location Middle West. P-709, Elec. Ry. Journ., Old Colony Bldg., Chicago.

COMPETENT master mechanic wanted for City property in Middle West. P-702, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

COMPETENT master mechanic wanted by street railway in Central West operating 70 cars; considerable portion of equipment light weight safety type; state age, previous experience, and salary desired; all replies will be considered strictly confidential. P-710, Elec. Ry. Journ., Old Colony Bldg., Chicago.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West; state experience, references, and salary desired when replying. P-605, Elec. Ry. Journal, Old Colony Bldg., Chicago.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

FIRST class street car mechanic wanted, one experienced with mechanical and electrical equipment of street cars. Address Corpus Christi Railway & Light Company, Corpus Christi, Texas.

ONE first-class armature room foreman wanted for a shop employing about thirty people. Must be familiar with all types railway armatures. State experience and salary desired. P-706, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

PERMANENT position for an experienced track supervisor on one of the large trolley systems in the East; must be capable of handling 18 to 20 track, bonding, welding and paving gangs; only men thoroughly familiar with trolley track construction and maintenance will be considered; state age, giving experience in detail, salary expected and references. P-682, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

PERMANENT employment for first class draftsman, familiar with electric and steam railway special work, with manufacturing concern near New York City; state full experience and salary desired. P-713, Elec. Ry. Journ.

TIMETABLE maker assistant, able, ambitious, experienced; state qualifications, experience and salary expected. Chicago Surface Lines, 804 Borland Bldg., Chicago.

POSITIONS VACANT

UTILITY company in West Indies desires services of young aggressive superintendent of street railway system; must have had similar experience elsewhere; be able to handle men and get along with labor; obtain efficient results; train employees and give the public efficient service. System operates 50 cars and 20 miles of track; only man of aggressive and efficient personality need apply. Give full particulars of past expereince, photo and reference. P-707, Elec. Ry. Journal.

POSITIONS WANTED

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CAPABLE technical man of proven executive ability, now employed, seeks opportunity in responsible position with a property where initiative and dependability are valued; 14 years' experience electric railway field; 10 years responsible charge of work; thoroughly competent in the design, maintenance and operation of equipment; successfully handled labor; experienced in making reports on traffic and methods of effecting operating economies. PW-708, Elec. Ry. Jornal, Old Colony Bldg., Chicago.

CLAIM agent 40 years old, active and full of life, long experience, desires to make change; expert shorthand writer, obtaining most thorough information investigating accidents, from both injured and witnesses; motormen and conductors most carefully instructed; fine record on low settlements; take own photos of accidents; thorough and up-to-date office system installed; excellent references. PW-694, Elec. Ry. Journal.

ENGINEER with broad experience desires position in constructing, maintaining, rehabilitating and appraising electric street and interurban railways. PW-711, Elec. Ry. Journ., Old Colony Bldg., Chicago.

POSITIONS WANTED

FOREMAN — Experienced in overhauling and maintenance of rolling stock, motors, etc.; handle men to advantage; best references. PW-712, Elec. Ry. Journ.

MAN, age 35, 16 years' experience in transportation departments as platform employee, inspector, instructor, dispatcher and assistant superintendent. Good schedule man. At present employed on property operating 90 cars. Will accept position offering advancement. PW-703, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

SUPERINTENDENT, 17 years' experience in transportation, traffic and mechanical, on road operating in eastern Ohio. A-1 references, executive ability, competent to assume full charge; can get results. Address PW-639, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT. Fully qualified in all departments; many years' experience in single track, high-speed, and city operation. Successful in handling labor and maintaining discipline. Now employed but desirous of bettering prospects. Requests the attention of presidents or managers having vacancies or contemplating changes. Excellent references from past and present employers. PW-638, Elec. Ry. Journal.

THOROUGHLY competent operating executive, now manager of small property, desires an opportunity to assume greater responsibilities, with better prospects for the future. Fully qualified in all departments. Most excellent references from present and past employers. Correspondence solicited. PW-637, Elec. Ry. Journal.

ELECTRICAL UNIT BARGAIN

Westinghouse 400 kw. Generator, 3-phase, 25-cycles, A.C., 220 volts, 136 r.p.m., serial 201925, with flywheel 11 in. x 14 ft., direct connected to cross compound Brown, heavy duty Corliss engine, 18 in. diameter piston by 36-in. stroke.

The above is in first-class second-hand condition.

For further information apply

J. P. NOONAN

816 Union Arcade Bldg., Pittsburgh, Pa.

NEW

80 lb. RAIL & ACCESSORIES

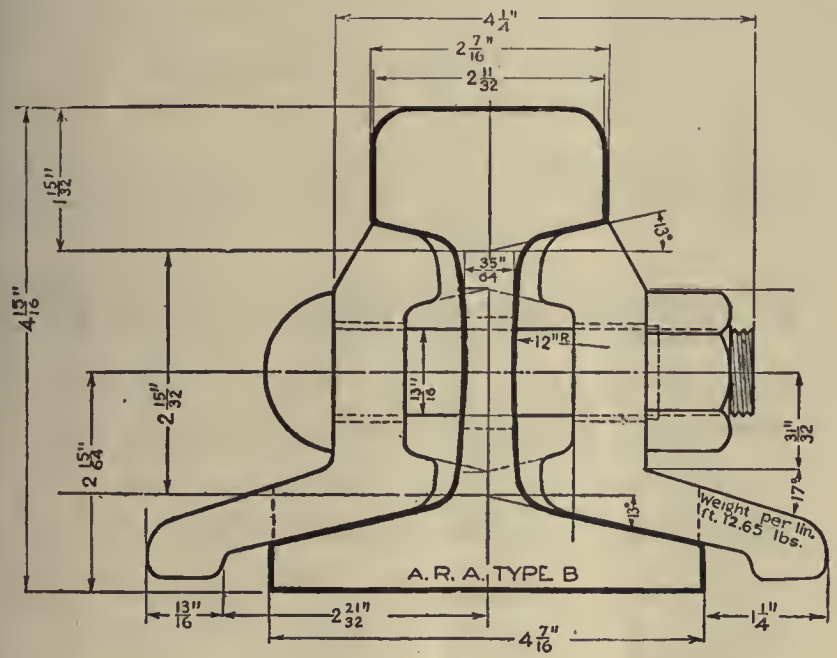
ANGLE BARS, SPIKES, BOLTS AND NUTS COMPLETE

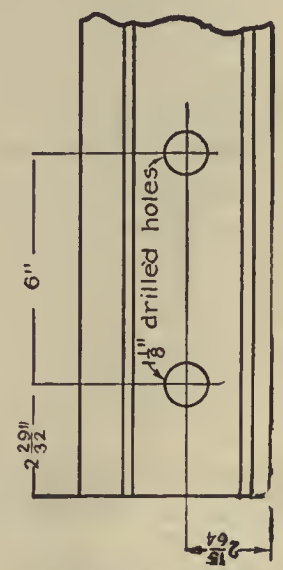
For Sale

A.R.A. "TYPE B" RAIL

Approximately 50,000 gross tons—drilled—standard lengths

Stored at Norfolk, Va. and Kearney, N. J.





Note actual dimensions of rail stated hereon.

HYMAN-MICHAELS COMPANY

Peoples Gas Building, Chicago, Ill.

New York Office
1324-1326 Woolworth Building

Pittsburgh Office
1312 First National Bank Building

St. Louis Office
2115 Railway Exchange Building

FOR SALE

Westinghouse Rotary Converter

Bargain Price—Instant Shipment

1—Westinghouse Rotary Converter, 300-kw. 600 volt, 3-phase 60-cycle 600 RPM complete with A. C. and D. C. switchboard. This outfit is in first-class operating condition, and ready for immediate service. Price FOB cars Indiana—$1,500. If interested use the wires at our expense.

WOOD AND LANE COMPANY
St. Louis, Mo.

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be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
1570 Old Colony Bldg., Chicago.
533 Leader-News Bldg., Cleveland.
935 Real Estate Trust Bldg., Phila.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

WANTED

Superintendent for Suburban and Inter-urban Railroad

Must be young man capable of handling traffic, maintenance of way, and equipment. Apply giving experience and references.

F. L. BUTLER
General Superintendant
Winnipeg Electric Railway Co.
Winnipeg, Canada

FOR SALE

6—50-FT.

Interurban Cars

Complete

Mounted on Standard C-60-P Trucks; 4 West. No. 56 Motors.

Electric Equipment Co.
Philadelphia, Pa.

New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work.

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2—McKean Gaso-Electric Cars.
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5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.
Get Our List and Prices.
J. F. DONAHOO CO., Birmingham, Ala.

IMMEDIATE DELIVERY

Twenty-Five Cycle Rotary Converters

2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380-volts.
1—250-kw., 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380 volts.

Street Railway Motors

20—G.E. 800-volts with Form K Controllers.
All in Splendid Condition

JOSEPH MEYERSON, 411 Atlantic Ave., Boston 9, Mass.

FOR SALE

5—400 hp.

Hazelton Porcupine Boilers

for 150 lb. steam pressure, complete with Murphy stokers, Squires feed water regulator, used five years, all in good working order.

United Electric Light Co.
Springfield, Mass.

Caution—RAIL USERS

BUY NOW. There is a SCARCITY. We offer the following NEW RAILS for prompt shipment:

New 12-lb. and 30-lb. rails, splices, bolts and nuts.

New 90-lb. rails, angle bars, bolts, nuts and spikes.

They will be gone soon. Write or wire for our quotations.

Wire—300,000 lb. or more of copper trolley, feeder, high tension, etc.

A number of steel bridges on line of Cincinnati & Columbus Traction Co. For quick acceptance at $1.00 per 100 lb. as is. Photographs on request.

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Prompt Shipment From Stock

2—Brill double truck combination passenger and baggage cars, 38 ft. long overall, passenger compartment 19 ft. 6 in. long, baggage compartment 8 ft. 7 in. long, equipped with four No. 101-B Westinghouse motor equipment complete.
1—Work car, equipped with two No. 49 Westinghouse motors complete.
40,000 lbs. No. 4/0 grooved trolley wire.
8 miles of 350,000 c.m. stranded, weatherproof cable.
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MacGovern & Company, Inc.
114 Liberty Street, New York, N. Y.
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WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment; from stock material, of coils commutators—shafts—bearings, etc. Remember our initials stand for our product.

CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

FREQUENCY CHANGER SETS

1—600 kva., Allis-Chalmers Frequency Changer Set, 300 r.p.m., 3-phase, 60-cycle, 2300-v. one end, 3-phase, 6600-v., 25-cycle on other end.
1—400 kw., G. E., 3-phase, 25-cycle, 6000-v. one side—2400-v., 2-phase, 60-cycle other side—375 r.p.m.

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114-118 Liberty Street, New York City
Telephone 4337-4338 Rector

Some One Wants to Buy

the equipment or machinery that you are not now using.

This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it *Before* depreciation *Scraps* it.

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RAILS IN STOCK

IMMEDIATE SHIPMENT

GUARANTEED

10,000 Tons New 12-lb. to 100-lb., and fastenings
40,000 Tons New Open-hearth, first quality, 80 lb.
5,000 Tons Relayers, 25 to 100 lb., and fastenings.
Car and less carload inquiries and orders solicited.
Rails cut to lengths for all purposes.

TRACK ACCESSORIES
BOLTS, NUTS AND SPIKES

We Manufacture

FROGS, SWITCHES, CROSSINGS, PORTABLE TRACK, DUMP CARS, PLATFORM CARS, ETC.

L. B. FOSTER COMPANY

Park Building
Pittsburgh, Pa.

Tribune Building, 154 Nassau St.
New York, N. Y.

You will find—

The Latest Equipment Bargains
The Big Business Opportunities
The Best Positions Vacant
The High-grade Executives
The "Live-wire" Operatives

in the

SEARCHLIGHT SECTION

The "opportunity center" of this industry

Look over the "Searchlight" pages of this issue—NOW

0011

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Babbitt Metal
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

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Gurney Ball Bearing Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Bricks, Fire
Green Engineering Co.

Brooms, Track, Steel or Rattan
Zeinicker, W. A., Supply Co., Inc.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car (See Headlining)

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Comelong
Bush Electric Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
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Condensers
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Westinghouse Elec. & Mfg Co.

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Eureka Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal and Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.
Green Eng. Co.
Portable Machinery Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices (See also Track Work)
Cleveland Frog & Crossing Co.
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

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National Pneumatic Co., Inc.
Safety Car Devices Co.

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General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zeinicker Supply Co., Inc., Walter A.

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Roebling's Sons Co., J. A.

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Archbold-Brady Co.
Arnold Co The
Byllesby Co., Inc., H. M.
Clark Management Corp., E. W.
Engel & Hevenor
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jacobs & Co., J. L.
Jackson, Walter
Kelly-Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Engineering Corp., The J. G.

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Westinghouse Elec. & Mfg. Co.

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Cleveland Fare Box Co.
Johnson Fare Box Co.
National Railway Appliance Co.

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Flooring, Grating
Irving Iron Works

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Inc., Wm.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

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Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Fuse, Removers
Bush Electric Co.

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Ohio Brass Co.

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Power Specialty Co.
Westinghouse Traction Brake Co.

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Standard Steel Works Co.

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Westinghouse Elec. & Mfg. Co.

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General Electric Co.
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General Electric Co.

Generators
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Westinghouse Elec. & Mfg. Co.

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Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

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Ford-Chain Block Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Hose
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Niles-Bement-Pond Co.

Inspection
Electrical Testing Lab's

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General Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instrument Co.

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Westinghouse Elec. & Mfg. Co.

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Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Mitchell-Rand Mfg. Co.
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Insulations (See also Paints and Varnishes)
Okonite Co.

Insulators (See also Line Material)
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Drew Electric & Mfg. Co.
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Electric Service Supplies Co.
General Electric Co.
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Westinghouse Elec. & Mfg. Co.

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Hubbard & Co.

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Templeton, Kenly Co., Ltd.

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Rail Joint Co.
Zelnicker Supply Company, Inc., Walter A.

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Brill Co., J. G.

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Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

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Lathes, Car Wheel
Niles-Bement-Pond Co.

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Drew Electric & Mfg. Co.
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Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Universal Lubricating Co.

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Universal Lubricating Co.

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Niles-Bement-Pond Co.

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Magnet Wire
Belden Mfg. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

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Wharton, Jr., & Co. Wm.

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Belden Mfg. Co.

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Mitchell-Rand Mfg. Co.

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National Ry. Appliance Co.

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Ohio Brass Co.

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Westinghouse Traction Brake Co.

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Electric Service Supplies Co.

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Hubbard & Co.

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Electric Railway Equipment Co.
Hubbard & Co.

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Nuttall Co., R. D.

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Electric Railway Equipment Co.

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National Ry. Appliance Co.

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Bonney-Vehslage Tool Co.
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Foster Co., L. B.
Lackawanna Steel Co.

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Lackawanna Steel Co.

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Zelnicker, Walter A., Supply Co., Inc.

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St. Louis Car Co.

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Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

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American Steel & Wire Co.
Carnegie Steel Co.

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Electric Service Supplies Co.

Repair Work (See also Coils)
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General Electric Co.
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Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Barrett Co., The

Rubber Covered Wires and Cables
Belden Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co

Sash Fixtures, Car
Brill Co., The J. G

Scrapers, Track (See Cleaners and Scrapers, Track)

Seats, Car (See also Rattan)
Brill Co., The J. G.
St. Louis Car Co.

Second-Hand Equipment
Archer & Baldwin
Cleveland Armature Works
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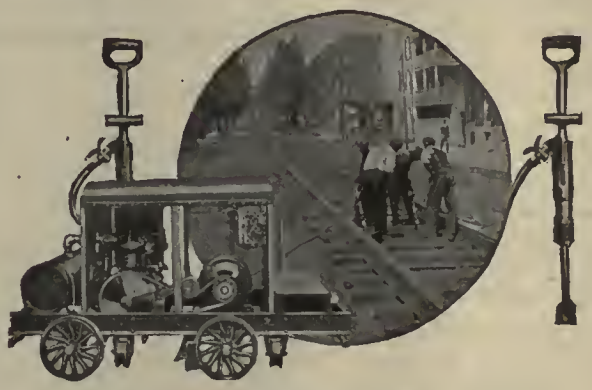
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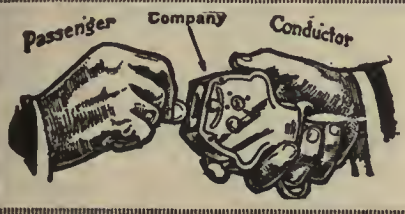
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Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

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Slag
Carnegie Steel Co.

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Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
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Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Solderless Connectors
Frankel Connector Co.

Spikes
American Steel & Wire Co

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Mason Safety Tread Co.
Irving Iron Works
Universal Safety Tread Co.

Steps, Ladder and Stairs (non-slipping)
Irving Iron Works

Steps, Safety
Irving Iron Works

Stokers, Mechanical
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Subway Grating
Irving Iron Works

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Indianapolis Switch & Frog Co.
Ramapo Iron Works

Switches, Track (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.

Switches and Switchboards
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Synchroscopes
Weston Elec'l Instrument Co.

Tampers, Tie
Ingersoll-Rand Co.

Tanks, Ash and Coal Storage
Green Engineering Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Tie Plates
Lackawanna Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
Williams & Co., J. H.

Tools, Linemen's
Bush Electric Co.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Williams & Co., J. H.

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Hubbard & Co.
Railway Track-work Co.

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New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.
Wharton, Jr., & Co., Inc., Wm.

Transfer Tables
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Transfers (See Tickets)

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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American Mason Safety Tread Co.
Universal Safety Tread Co.

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Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Trolley Bases, Retrieving
Anderson Mfg. Co., A. & J. M.
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—Edward N. Hurley

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Mr. Hurley said:

"When I was Chairman of the Federal Trade Commission, I made it a point to have the principal trade papers in the United States sent to me regularly. These were read not only by myself, but by the entire staff, so that we might have a finger on the pulse of the country's industry.

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Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company

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Over six million feet used without accident being reported within the knowledge of manufacturer. Our products used on all leading railroads on cars and stations. For details address:

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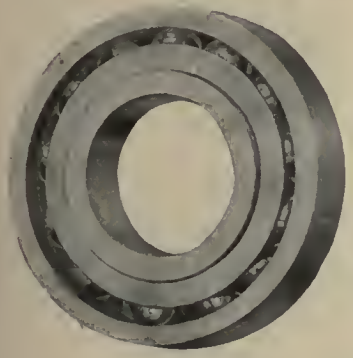
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cars and station steps.

Universal Safety Tread Company

40 Court St., Boston, Mass.



How the Larger Balls of Gurney Bearings Reduce Unit Pressure

A 500-pound weight on a surface of five square inches exerts a pressure of 100 pounds to the square inch.

If that same 500 pounds rested on ten square inches the pressure would be decreased to 50 pounds to the square inch.

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Conrad Patent Licensee
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BALL BEARINGS





After having once used COLUMBIA Gear Cases

You will decide to use Columbia products exclusively in the future. Because Columbia-made Gear Cases are built to stand the hardest service—bumping over poor paving, and in the winter time dragging over snow. Suspension points are fracture-proof and not receptive to dust and mud.

The most reasonably priced high quality gear case obtainable. Sheet steel or malleable iron.

We are prepared to make prompt deliveries on any of the Columbia Specialties listed below.

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Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



BRILL SEATS



Reversible Backs

"Winner"

The Brill "Winner" Seat is of long established reputation. Its efficient operation and sturdy construction are responsible for its success.

The seat illustrated is upholstered in rattan, with spring cushion and back, has one-piece pressed-steel pedestal, aisle and wall plates, and its mechanism is the present standard for this type. An important feature is the double lever arrangement at both wall and aisle ends, which gives greater stability in reversing the cushion.

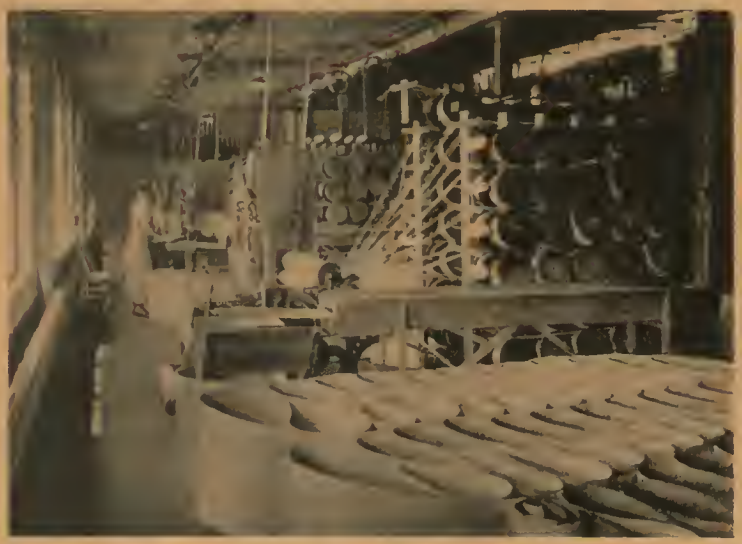
Also furnished of slat, either ash, cherry or birch, as specified.

"Waylo"

The Brill "Waylo" Seat was specially designed for the light-weight Birney Safety Car. Consequently, it weighs but 30 lb. complete.

Its construction includes pressed-steel pedestal and aisle plate in one piece, pressed-steel wall plate, and the "Waylo" mechanism so designed to permit raising the cushion with the back in either position.

Furnished with or without foot rest, and with type of grab handle as specified.

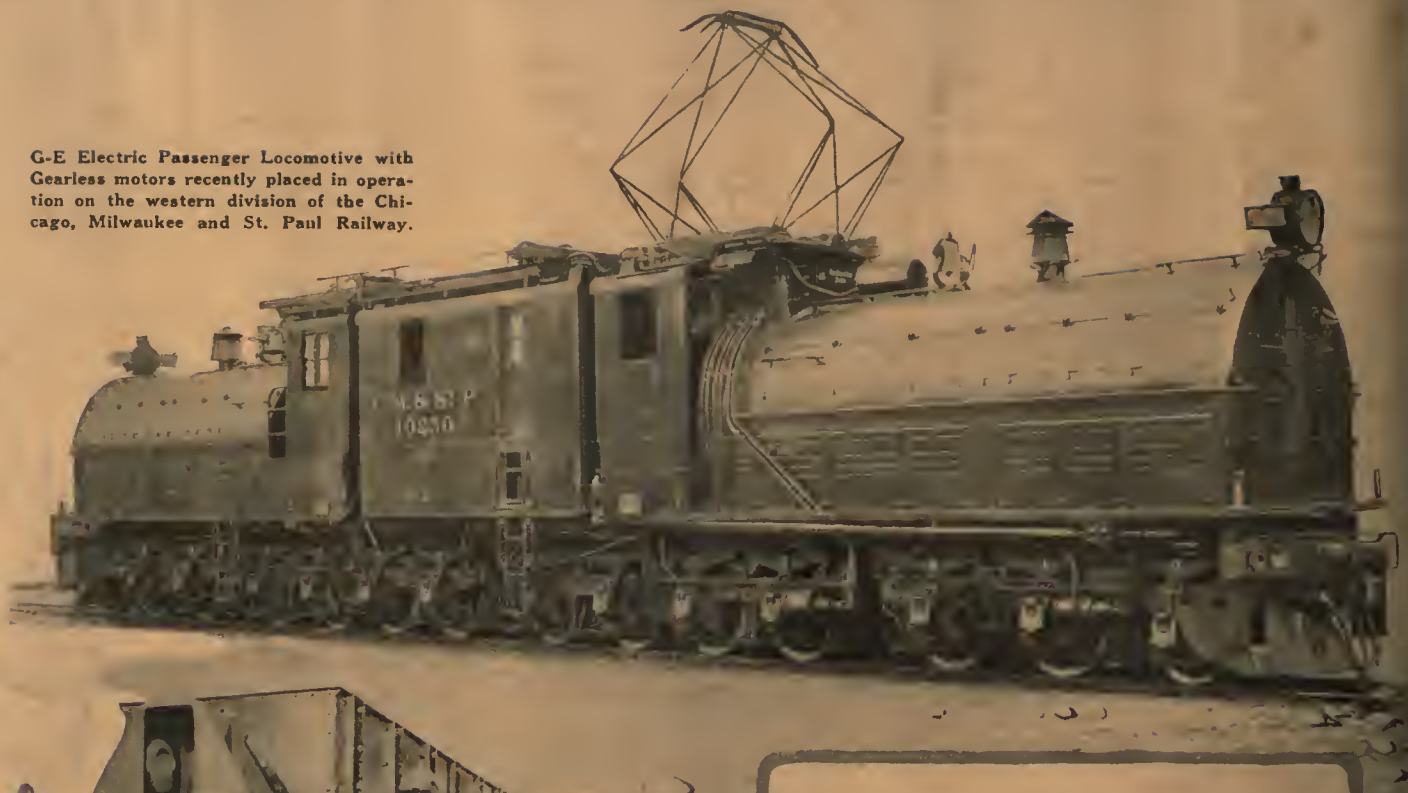


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Seating Rattan, lined or unlined, furnished in any width from 14 to 36 inches.

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PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



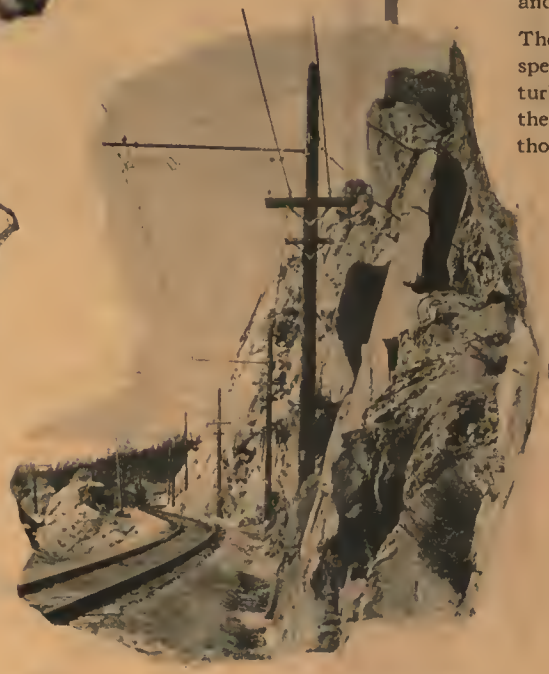
G-E Electric Passenger Locomotive with Gearless motors recently placed in operation on the western division of the Chicago, Milwaukee and St. Paul Railway.



Gearless motors showing frame raised off of armatures.



Sliding pantograph is light but strong and has great current carrying capacity.



G-E Line Material—Twin catenary construction on Rocky Mt. Section.

Gearless Motors for Super-Service

High-Speed running, flexibility in control and minimum weight per axle have resulted from the use of gearless bi-polar motors, on the Chicago, Milwaukee & St. Paul Railway's locomotives.

Motor armatures are built directly on the axles with wheels pressed and keyed in place.

There are no motor bearings or gears, the design being the last word in simplicity.

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Lowest maintenance cost, highest operating efficiency and absolutely guaranteed performance, that is the whole story of General Electric locomotives.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

25-75

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc. August 7, 1920 Twenty Cents Per Copy





Baggage and Express Cars Make Good Snow Fighters

They should be equipped with this in view.

Freight can be hauled at the same time they keep roads open during winter storms. Each one should have its detachable snow plow, truck guard and other snow-fighting equipment.

As to the proper equipment, Westinghouse No. 306 or No. 548 motors and HL Control are recommended, for they have weathered many winters successfully.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.



W
WESTINGHOUSE ELECTRIC



Vol. 56, No. 6 New York, August 7, 1920 Pages 253-300

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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One of the 200 new Brooklyn Rapid Transit "Safety" Cars, all of which are equipped with "Bungalow" air compressors.

"Bungalow" type air compressor

The "BUNGALOW" air compressor, essentially a "Safety" car machine, has been included in all the largest installations.

From the big metropolitan cities, where the greatest density of street car traffic exists, comes the most urgent call for air brake equipment that will give reliable service and insure freedom from traffic tie-ups and delays.

Such is Brooklyn, N. Y., for whose busy surface lines the Brooklyn Rapid Transit Company recently selected "Bungalow" air compressors for its entire number of 200 new "Safety" cars.

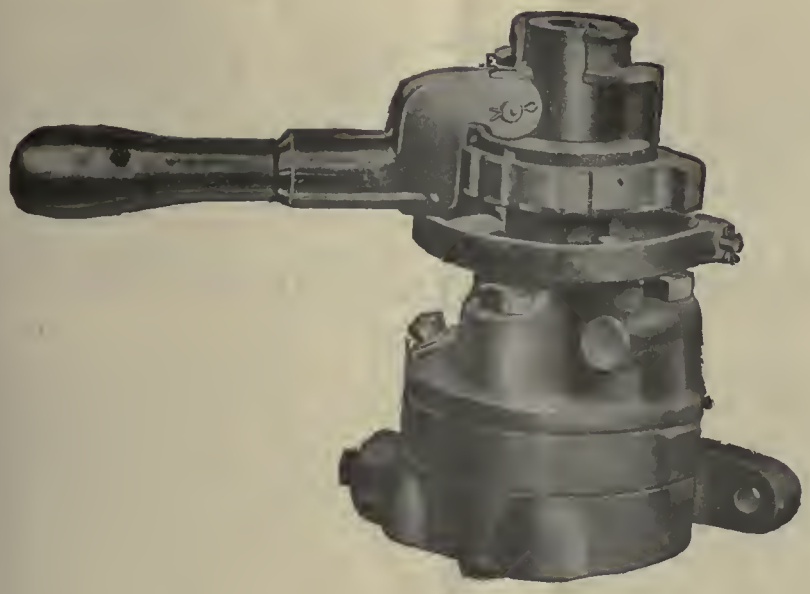
Over **3252** "Safety" cars now running on **182** different electric lines throughout the United States, are equipped with "Bungalow" compressors.

Brake Building Our Business for a Lifetime

Westinghouse Traction Brake Company

General Offices, Pittsburgh, Pa. Works, Wilmerding, Pa.

New York Chicago Washington St. Louis San Francisco



Air Brake and Safety Car Control Equipment

THE following telegram from Chas. R. Hunter, Mayor of Terre Haute, Indiana, is an interesting sidelight on the efficiency of the one-man safety car. Interesting because it gives the viewpoint of the Civic Representatives rather than that of the operating official:

> *"We are operating* 56 *one-man cars. Expect to have more. They give absolute satisfaction to the public in general. City administration is well pleased with results of one-man cars and the good service they are rendering. We feel they are giving about* 100 *per cent efficiency.*
>
> (*Signed*) CHAS. R. HUNTER, Mayor."

The Safety Car will reduce operating costs and increase operating efficiency on your property. But remember—it is a safety car only when equipped with automatic laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sands apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO Railway Exchange Bldg. | WASHINGTON, D. C. Munsey Bldg. | NEW YORK City Investment Bldg. | PITTSBURGH Westinghouse Bldg.

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Phono-Electric

In New Orleans Since 1907



On April 2, 1907, the New Orleans Railway & Light Company installed its first Phono-Electric Trolley Wire.

Today about 150 miles of the system are in Phono-Electric Trolley Wire.

Isn't that a mighty good reason why disturbances to traffic due to overhead failures are so scarce in the Crescent City?

The same peace of mind and satisfactory contact wire service are yours, too, if you follow the New Orleans example of standardizing on Phono-Electric Trolley Wire.

Bridgeport Brass Company

Bridgeport Connecticut

2235





National Trolley Guard
(Potented)
An inverted trough of open wire mesh. When the wheel leaves the wire it runs on the live guard and carries car and cargo to safety.

How many times have you paid for National Trolley Guard?

The other day a western property paid for National Trolley Guard for all its grade crossings.

The tragedy is they haven't a foot of it on the road.

The trolley wheel jumped on a grade crossing.

The retriever retrieved.

The conductor—green—couldn't release the rope.

He warned the passengers just before the train arrived. The wreckers raked up the car.

Buy National Guard and get it before you pay for it anyway.

Send for "Guarding the Grade Crossings."

The Ohio Brass Company
MANSFIELD, OHIO

New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles

STYLE "N" COLOR LIGHT SIGNALS

UNION equipment will solve *your* interurban traffic problems. Let us study your operating conditions and co-operate with you in considering what *automatic block signaling* will do for *your* line.



Trade Mark

Union Switch & Signal Co.

SWISSVALE, PA.

Trade Mark



INTERNATIONAL
STEEL CROSSING FOUNDATIONS

take the trouble out of compromise joints near Crossings

THESE specially designed Steel Foundations for troublesome Crossings save maintenance and prolong frog life, but one feature welcomed by many electric railways is the compromise joint step, built into the foundation, which carries the high rail of the street track into the arms of the crossing.

The familiar battered low joints at crossing connections may become dangerous if frequent attention is not given to them. They are the cause of much expense.

But on a firm steel bearing cushioned with wood, compromise joints are trouble-proof and safe.

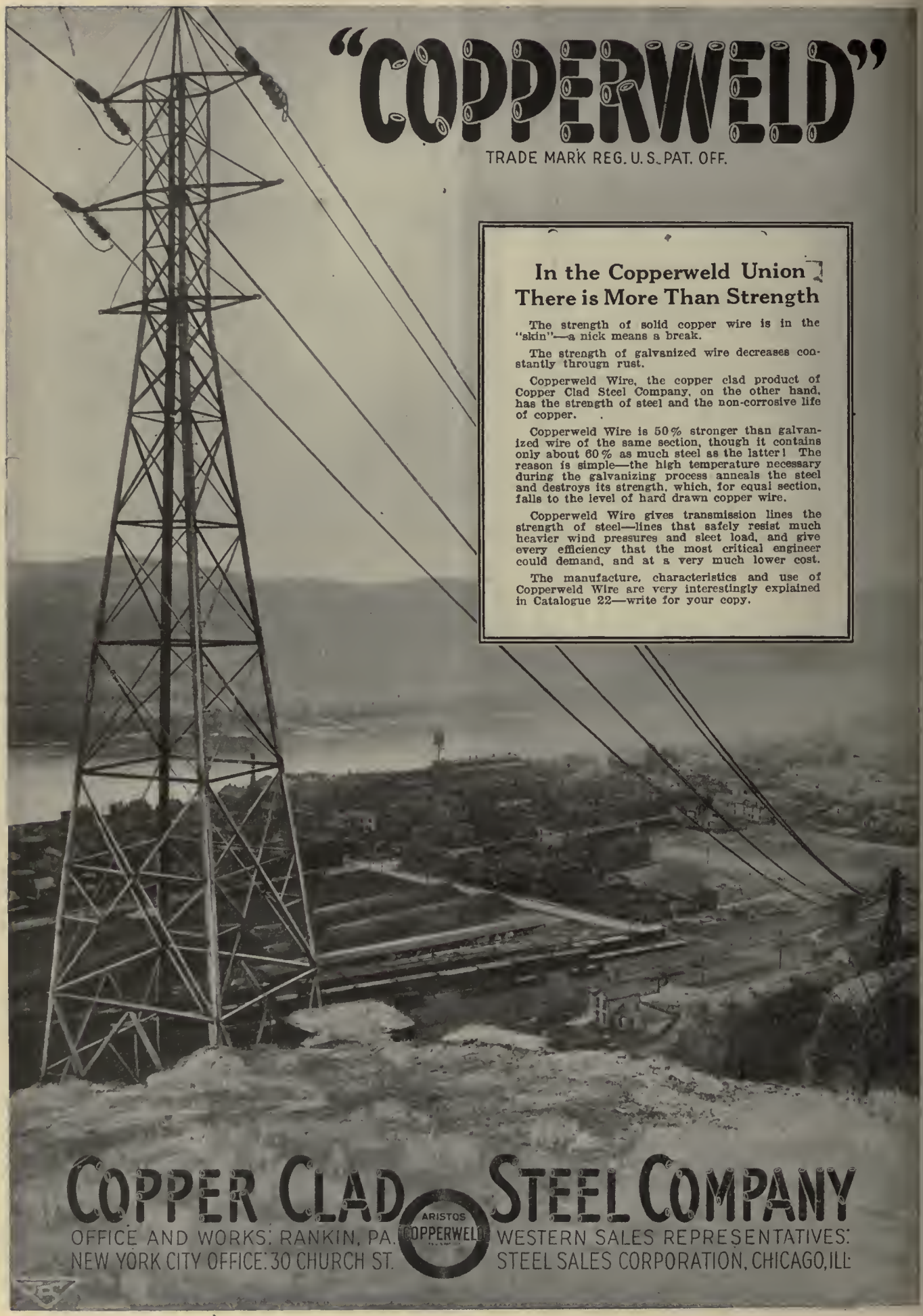
Most of our recent orders are from electric railways who have from four to ten crossing foundations in service.

Let us prepare proposal plans on your Fall renewal.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio


"COPPERWELD"
TRADE MARK REG. U. S. PAT. OFF.
In the Copperweld Union There is More Than Strength
The strength of solid copper wire is in the "skin"—a nick means a break.
The strength of galvanized wire decreases constantly through rust.
Copperweld Wire, the copper clad product of Copper Clad Steel Company, on the other hand, has the strength of steel and the non-corrosive life of copper.
Copperweld Wire is 50% stronger than galvanized wire of the same section, though it contains only about 60% as much steel as the latter! The reason is simple—the high temperature necessary during the galvanizing process anneals the steel and destroys its strength, which, for equal section, falls to the level of hard drawn copper wire.
Copperweld Wire gives transmission lines the strength of steel—lines that safely resist much heavier wind pressures and sleet load, and give every efficiency that the most critical engineer could demand, and at a very much lower cost.
The manufacture, characteristics and use of Copperweld Wire are very interestingly explained in Catalogue 22—write for your copy.
COPPER CLAD STEEL COMPANY
OFFICE AND WORKS: RANKIN, PA.
NEW YORK CITY OFFICE: 30 CHURCH ST.
ARISTOS COPPERWELD
WESTERN SALES REPRESENTATIVES:
STEEL SALES CORPORATION, CHICAGO, ILL.



THESE PEOPLE WILL PAY THE COST OF GOOD SERVICE

ELECTRIC SERVICE SUPPLIES COMPANY TRADE MARK

Service That Offers

FARADAY CAR SIGNALS

They Have Distinct Advantages

FOR YOU

They avoid unnecessary stopping and starting and are clear and positive in operation. They eliminate the cost and use of batteries.

FOR THE PUBLIC

They make signalling dependable and insure attention from the car crew.

They are easily reached and operated.

Write for Data Sheets







ELECTRIC SERVICE SUPPLIES CO.

Manufacturers of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

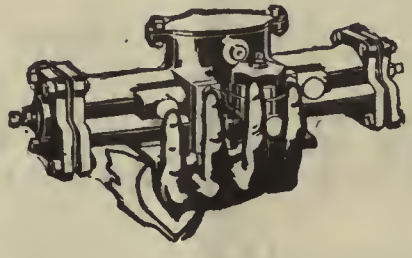
CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg.

And Reason No. 1 Is

"The perfection of mech

Standardize!



The national Safety Council has lately analyzed street car accidents during 1917, 1907 and 1902 and this is what it finds:

That in 1907 fatal accidents on the basis of 1 person killed for every 3,086,319 passengers carried was double the figures for 1902; but that in the decade 1907-1917, one passenger was killed for every 4,393,572 carried—a reduction of 33%.

It was during this latter period that the all-enclosed vestibuled car with National Pneumatic Door and Step Control Motorman's Light Signals and Safety Interlocking Door Control were developed to combine faster and safer passenger interchange with better fare collection.

Secure Speed, Economy and

National Pneumatic Company, Inc.

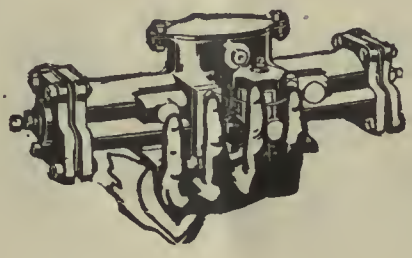
50 Church Street, New York Edison Bldg., Chicago

Works: Rahway, N. J.

the Best of Reasons

cal safety devices"

Pneumatize!



So we heartily endorse the Safety Council's opinion that this striking reduction in hazards in the face of a heavy increase in population is due almost entirely to:

1. THE PERFECTION OF MECHANICAL SAFETY DEVICES.

2. Improved methods of operation.

3. The training both of the general public and of electric railway employes along safety lines.

Make a good record better still by equipping all of your cars with the National Pneumatic "Rushour" Safety line to

Safety Every Hour of the Day

National Pneumatic Company, Inc.

50 Church Street, New York Edison Bldg., Chicago

Works: Rahway, N. J.





3 in 1 for Missoula, Montana

The street railway company at Missoula, Montana, required Tubular Steel Poles for supporting their span wires —the merchants and city officials desired a "White Way"— the lighting company needed poles for their service wires —rather than install two pole lines and separate Lamp Standards, which would only serve to crowd the curb line, the "ELRECO" Combination Railway and Lighting Pole was selected.

If you have a similar problem, you can profit by following the example of Missoula, Mont.

ELECTRIC RAILWAY EQUIPMENT CO.

Cincinnati, Ohio

New York: 30 Church Street



Copper wire depends on the purity of the copper and the method of drawing, for its quality.

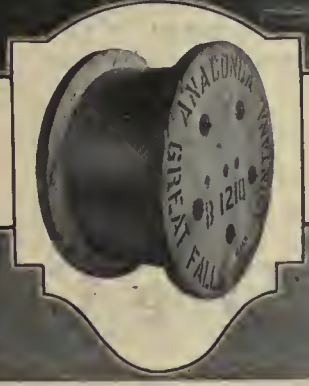
Anaconda Copper wire is made from B & M Brand electrolytic copper bars. The average conductivity of this copper is 100.75 Mathiessen's Standard, and its metallic impurity content less than 1/100 of 1%.

Anaconda's wire drawing methods are most up to date. Every step in the manufacturing process is carefully checked by rigid self imposed tests.

Anaconda Copper Mining Company
Rolling Mills Department
Mills—Great Falls, Montana
General Office: 111 *W. Washington St., Chicago*

Annealing Ovens
Anaconda Mills
Great Falls, Mont.





ANACONDA Copper Wire
"From Ore to Finished Product"

INDIANAPOLIS



at the rate of one every forty minutes completely welded and ground is the record made by a large progressive railway with the

Heavy Duty High Speed Indianapolis Portable Patented Electric Welder

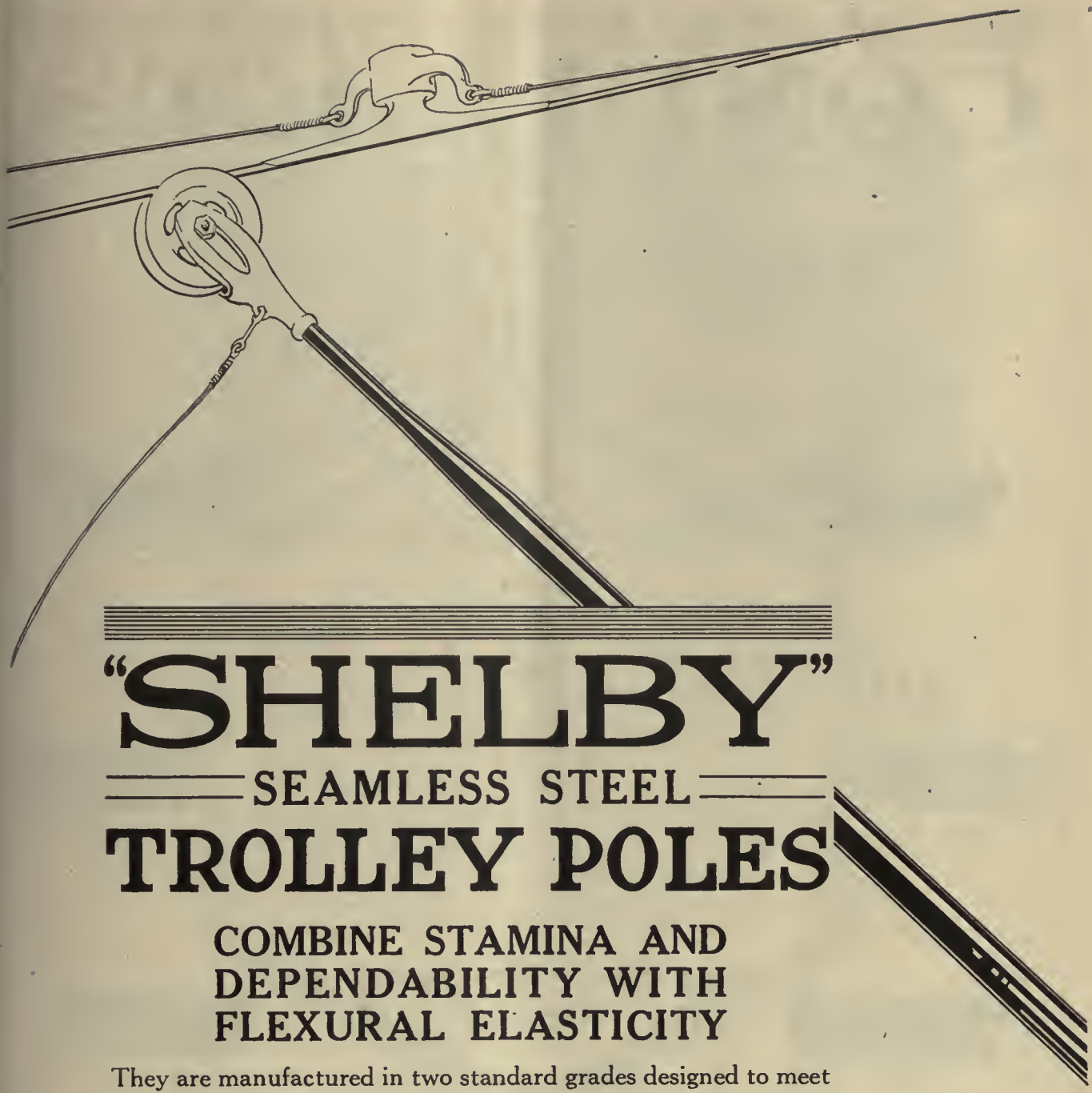
You can do equally as well on your own property and extend the life of your track for years at the same time realizing enough through your savings to pay the entire cost of the electric welder and the welding equipment in from two to three months.

A letter addressed to the Indianapolis Switch & Frog Co., Springfield, Ohio, will bring details of how hundreds of railways in the United States and Canada are getting the maximum of service out of their trackage at a minimum expense.

Could anyone ask more?

Efficient and economical, it has been truthfully said that Indianapolis Apex Welded Joints are "The greatest aid of the Way Engineer."

Indianapolis Switch & Frog Co.
Springfield, Ohio



"SHELBY"

SEAMLESS STEEL

TROLLEY POLES

COMBINE STAMINA AND DEPENDABILITY WITH FLEXURAL ELASTICITY

They are manufactured in two standard grades designed to meet the different requirements as to strength and service imposed by beam stresses, shock, and other conditions regularly encountered in trolley operation, and are thoroughly tested before leaving the mill.

THE RECOGNIZED STANDARDS OF SEAMLESS STEEL TROLLEY POLES

Ask for Booklet "The 'SHELBY' Seamless Cold Drawn Steel Trolley Pole"

NATIONAL TUBE COMPANY

General Sales Offices: FRICK BUILDING, PITTSBURGH, PA.

District Sales Offices in the Larger Cities

STEEL FOR SERVICE

CONDULETS

Mogul Condulets—Big Wiring Chamber
A New Series



Type BU with 1-wire cover.



Type BUB with 7-wire cover.

MOGUL Condulets are designed to meet the demand for a Condulet having an unusually long cover opening so as to avoid kinking heavy wires or cables when pulling in or feeding through a conduit system. Furthermore these Condulets have a large wiring chamber for making splices or taps.

Mogul Condulets though liberal in their proportions do not materially affect the general outline of the conduit system. The hubs have integral bushings and tapered threads. Fastening screw holes are located at the ends of the cover opening.

Mogul Condulets are made in eight types, each type in eight conduit sizes ranging from one to four inches.

There are four sizes of composition and cast iron covers, each size being common to two sizes of Mogul Condulet bodies. The composition covers are made with from one to nine wire holes; also blank, which can be drilled by the user as required.

The cast iron covers are made in two types, with gasket or without gasket. The gasket is made of round rubber, cemented into a groove in the cover. The cover fastening screws are furnished with and secured to the cover.



Type BX with 2-wire cover.



Type BLB with blank cover.

CROUSE-HINDS COMPANY

SYRACUSE, N. Y.

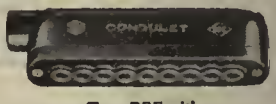
BOSTON NEW YORK CHICAGO

Condulets Panelboards
Knife Switches Floodlights
Guy Anchors

1579



Type BC with 4-wire cover.



Type BBE with 9-wire cover.



Type BT with 3-wire cover.

Condulet the Job



Type BTB with 5-wire cover.

CROUSE-HINDS



Low cost High speed | Railbonding

In these days of high priced and "hard-to-get" labor, high-speed railbonding is one of the most important problems of maintenance. And since the speed with which the bonding is done has a direct effect upon bonding costs, high speed becomes doubly important. With

The ERICO Portable Welder

low cost and high speed are assured. As many as 120 bonds per day on pick-up work is not an unusual record for the Erico.

In addition, there's the light weight feature. The welder weighs only 65 pounds and the combined outfit but 200 pounds. It is easily removed from the track by two men.

Write today for complete data. Illustrated bulletin will be sent free on request.

The Electric Railway Improvement Company
Cleveland, Ohio



H. C. B. Switch

WHARTON SP

SWITCHES
MATES
FROGS
CROSSINGS

Solid Manganese Steel and Manganese Steel Insert

Converter and Electric Steel Castings
Hammer and Press Forgings Seamless Steel Gas Cylinders

WM. WHARTON, JR. & CO., INC.

EASTON, PENNA.

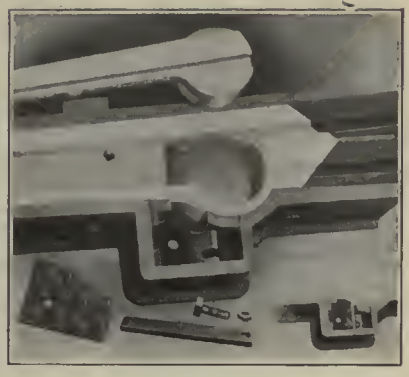
"Originators of Manganese Steel Track Work"

SALES OFFICES:

Boston, Mass.
Chicago, Ill.
Denver, Colo.
New York City
Philadelphia, Pa.
Pittsburgh, Pa.
San Francisco, Cal.
Scranton, Pa.



L TRACK WORK



"GIANT HEEL" Switch



The illustration below gives a comprehensive view of our large Layout Yard, where Special Track Work is assembled and carefully fitted together, to avoid any possibility of trouble during installation. No piece of work leaves our plant without such careful fitting.

Our extensive, modern plant, illustrated on the preceding page, is equipped to fabricate track work of all constructions, Solid Manganese Steel, Manganese Steel Insert, Plain Bolted and Manganese Steel "T" Rail, etc., which, coupled with our long experience, places us in a position to supply your needs efficiently.

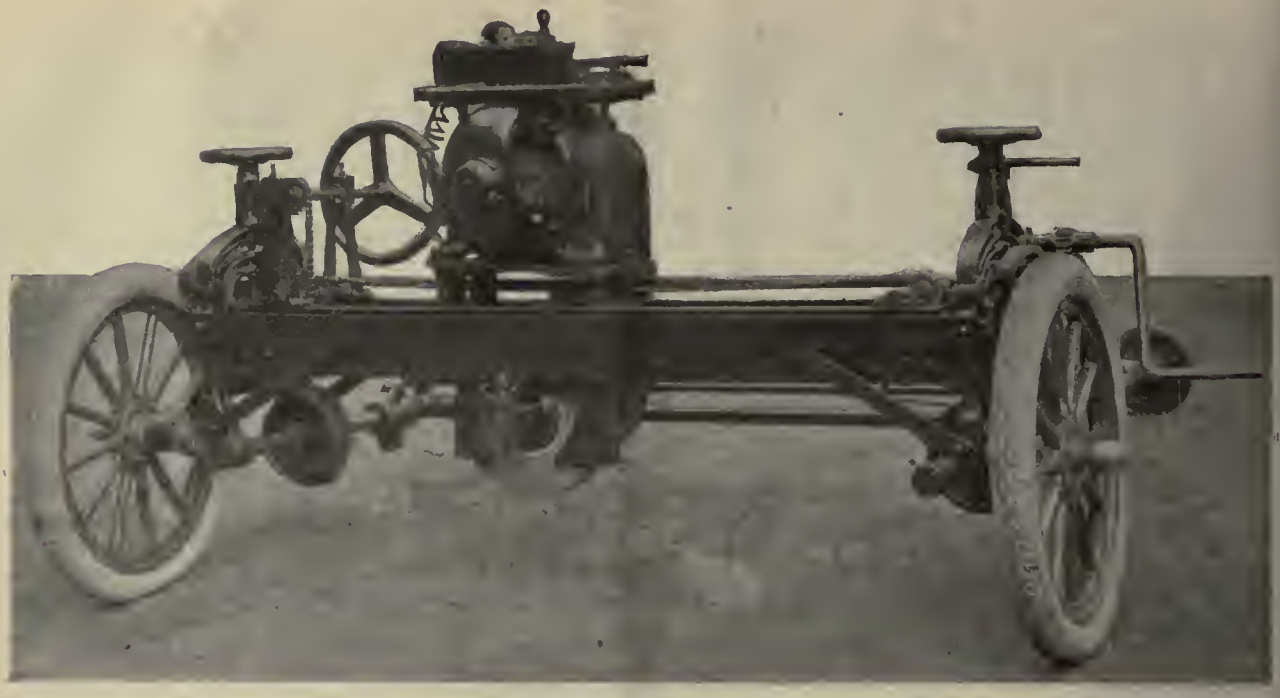
Subsidiary of Taylor-Wharton Iron & Steel Co.

High Bridge, N. J.

Other Plants:

TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.
PHILADELPHIA ROLL & MACHINE CO., Philadelphia
TIOGA STEEL & IRON CO., Philadelphia





Universal Rotary Track Grinder

A Direct Drive Motor

Is mounted on a hinged plate. The drive is direct to the grinding wheel, making it impossible for drive to get out of alignment. The tightening of belt is accomplished by the adjustment of one bolt only. To insure a gradual run off, an adjustment, at either end of the machine, for raising the grinding wheel clear, has been provided.

The Universal Rotary Track Grinder

Besides being manufactured of the finest materials, also distinguishes itself with the following features:

1. **Large Pneumatic Derail Wheels**
2. **Outboard Bearing on the Grinding Wheel Arbor**
3. **A Grinding Wheel that may be tilted to meet any angle of the rail head**
4. **Adjustable Outrigger**
5. **Easy adjustment of all parts**
6. **Easy operation**
7. **Low working economy**

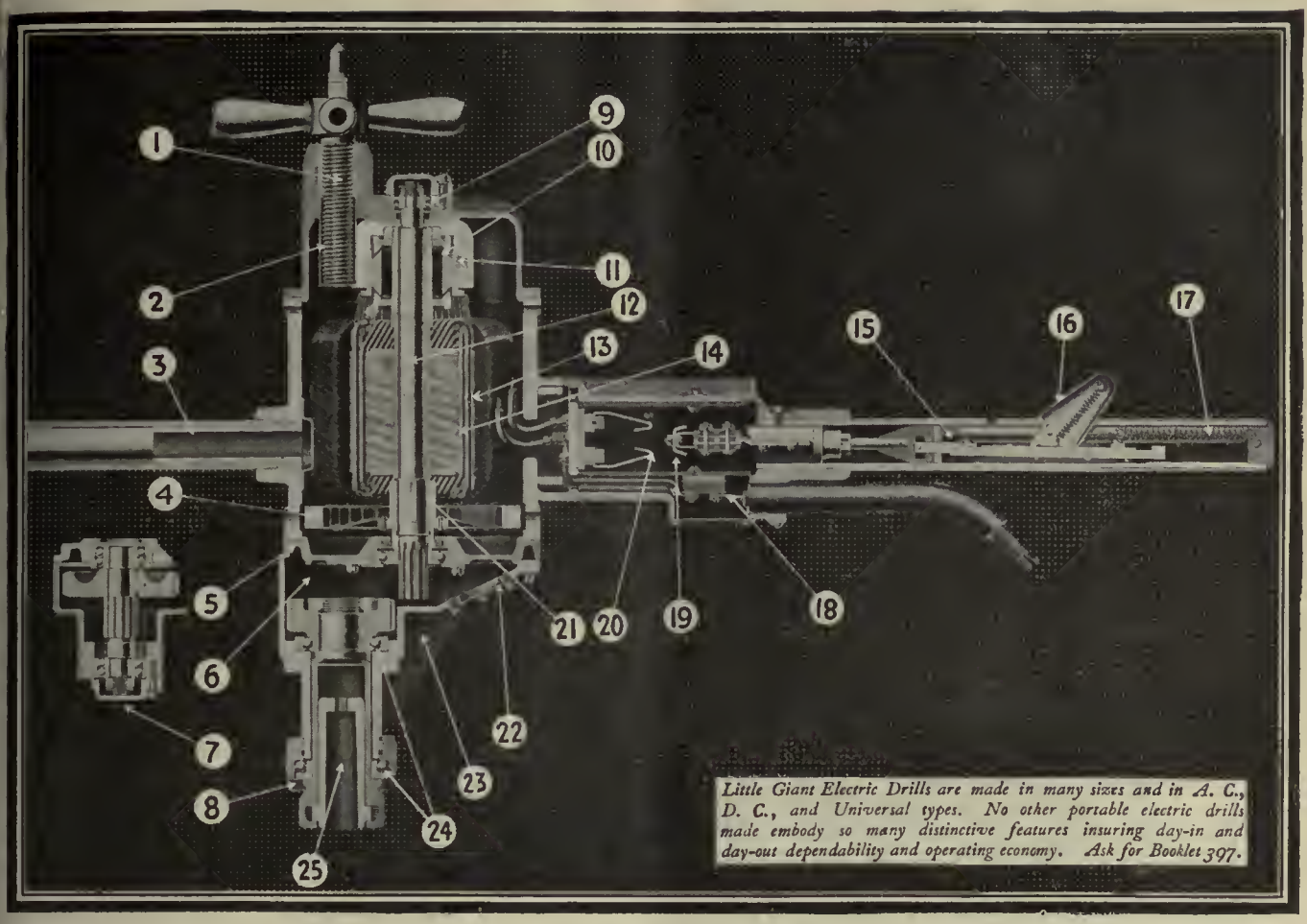
We also make the "Atlas Rail Grinder" and "Reciprocating Track Grinder"

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

Exclusive Agents:
ATLAS RAILWAY SUPPLY CO., Chicago, Ill.
ELECTRICAL ENGINEERING & MANUFACTURING CO., Pittsburgh, Pa.

Exclusive Agents:
CHAS. N. WOOD CO., Boston, Mass.
HITCHCOCK, LLOYD & CO., Inc., 77A Queen Victoria St., E. C., London, England.



Little Giant Electric Drills are made in many sizes and in A. C., D. C., and Universal types. No other portable electric drills made embody so many distinctive features insuring day-in and day-out dependability and operating economy. Ask for Booklet 397.

Inside Information

why Little Giant Electric Drills accomplish results

1 Long feed screw entering into body of supporting bracket, thus giving same results as telescopic feed.
2 Protecting sheath, preventing entrance of dirt into drill if feed screw is removed.
3 Dead handle reinforced at point of greatest strain.
4 Sheet steel fan, carefully balanced and reinforced, providing thorough ventilation.
5 Solid transfer plate or diaphragm preventing grease or oil in gear case from entering windings.
6 Liberal grease compartment for providing reliable lubrication of gears and ball bearings.
7 Section thru intermediate gears. Note wide double row of ball bearings at each end of gear shaft (used on large drills). Pinion and gears made of special alloy steel carefully heat-treated.
8 Dust protector for excluding dust from lower thrust ball bearing.
9 Ball bearing easily accessible for lubrication and inspection.
10 Commutator of sturdy design and construction, thoroughly insulated with mica.
11 Large opening with well secured and readily removable cover plates providing easy access to brushes and commutator.
12 One-piece armature shaft and pinion of tool steel, hardened and ground, insuring perfect alignment of pinion at all times. On large size drills armature shaft is removable from the armature core and commutator, which are mounted jointly on a quill or spider.
13 Laminated pole pieces, minimizing pole face losses (used on large drills).
14 Armature coils form wound, heavily insulated, and carried in insulated slots in armature core. After winding and connecting to commutator, coils and armature are again dipped in insulating varnish and baked.
15 Quick acting control switch, making slow break impossible and preventing destructive burning of contacts.
16 Conveniently located trigger for operating switch.
17 Safety return spring for automatically opening switch when operator removes hand from switch handle (used on large drills).
18 Terminal block for cable, permitting ready removal of cable without disturbing other connections.
19 Cover plates on each side of switch, providing easy access to switch contacts.
20 Double pole, double break switch. Rugged contacts are readily removable.
21 Long fan-hub of high grade steel, hardened and ground. Press fit on shaft with long key insures permanent rigidity.
22 Cover plate quickly removable for inserting grease in gear case.
23 Reinforcing rib on gear case, insuring proper strength and rigidity.
24 Combined annular and thrust bearing at each end of spindle.
25 Removable socket inserted in spindle. Driving lugs on socket milled from the solid.

Chicago Pneumatic Tool Company

6 East 44th Street
New York

Sales and Service Branches all over the World

EL-35

BOYER PNEUMATIC HAMMERS · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · · VACUUM PUMPS · · PNEUMATIC HOISTS,
GIANT OIL AND GAS ENGINES ROCK DRILLS · · COAL DRILLS

LITTLE *Electric* **GIANT** *Tools*



Riding comfort--whether the conveyance be an airplane, a motor car or a street railway car depends upon

Resiliency

Dayton Mechanical Ties give this property to a road bed, making a car ride as tho it were pneumatic tired.

The asphalt cushion provides the shock absorber, eases the pounding of heavy cars and prolongs the life of both road bed and equipment.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

Many Steam Roads as wel as Electric Railways are consistent users of

SPC. TONCAN METAL

Here are expressions from two of them.
Write for our Book on Sheet Metal.

The Stark Rolling Mill Co.
Canton, Ohio

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL OF RAILROADS
BOSTON & ALBANY RAILROAD

F. H. GILLIGAN
Supvr. B. & B.

WORCESTER, MASS. July 6th, 1920.

The Stark Rolling Mill Company,
Office 712, 30 Church Street,
New York.

Attention of Mr. F. C. Reed.

Dear Sir:

I understand that you are getting up a catalogue on Toncan Metal and I feel that it would not be out of place at this time to hand you a little recommendation for the benefit of those who do not use this class of material.

I might say that for the past ten years we have used nothing else but Toncan Metal, both plain and galvanized, and it has given perfect satisfaction and my sheet metal workers will not order anything else.

Very truly yours,
F. H. Gilligan
Supervisor of B&B.

FHG/M

BOSTON AND MAINE RAILROAD
J. H. HUSTIS, TEMPORARY RECEIVER

Salem, Mass., July 1, 1920.

The Stark Rolling Mills,
Canton, Ohio.

Gentlemen:-

Replying to your recent enquiry as to our experience with the Toncan metal, I am very glad to be able to say that this gave us splendid satisfaction. For use on Railroad buildings, I consider it second only to copper, and a fairly heavy weight of Toncan metal I consider superior to a light weight of copper.

I have some roofs that have been covered with this for about eleven years and are apparently in as good condition as when the metal was installed. I think this is an especially fine record for Railroad buildings that get a large amount of smoke and gases.

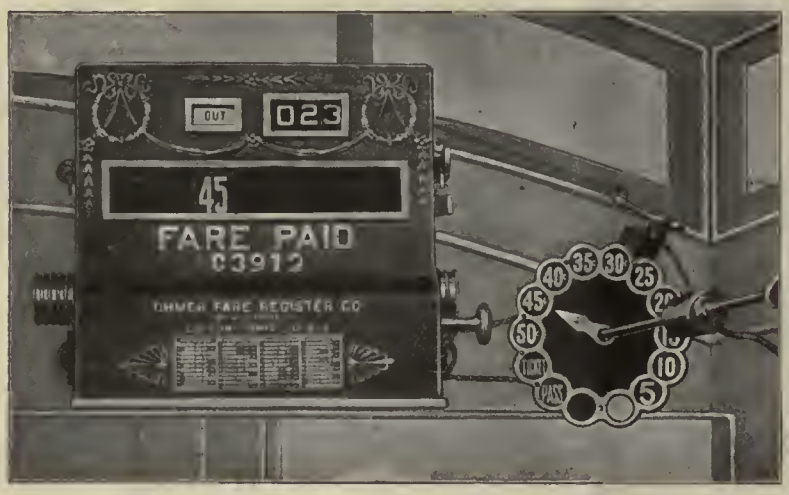
You are at liberty to make use of this testimonial in any way that may be of assistance to you.

Very truly yours,
B. Hakenny
Supvr. B. & B.



North Station
Boston & Maine R. R.
Boston, Mass.

Toncan used for the Sheet Metal Work.



An Interurban Type

The Ohmer System

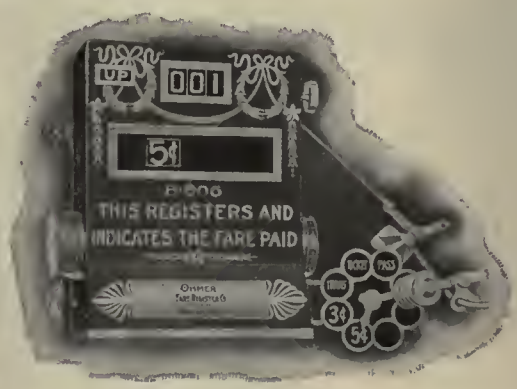
Interurban electric railway companies have made Ohmer fare registers a standard because many different fare denominations are accurately recorded, indicated and thoroughly protected.

City railway managers now realize that they also have a considerable variety of fare rates to be protected, and many Ohmer fare registers of types suitable for city service are being adopted. Cash fares in odd amounts, metal or paper tickets, school tickets, transfers, employes' passes, special passes, etc., are differentiated, indicated and properly recorded when Ohmer fare registers are used.

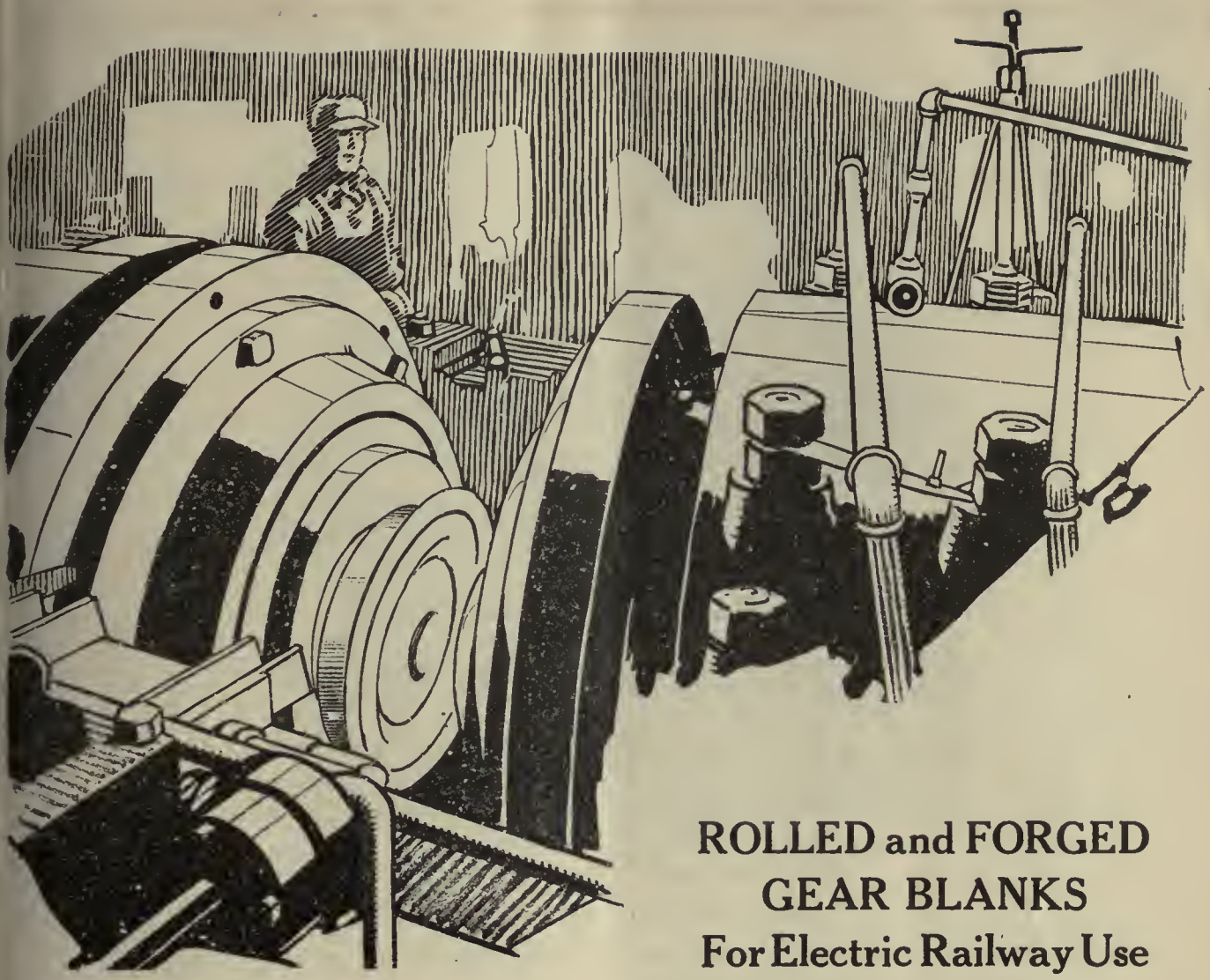
Operating equipments are made in every conceivable type for making Ohmer fare registers operative and absolutely satisfactory in every kind of car, and under any possible condition of service.

Don't experiment. Don't tie up your money unnecessarily. We finance the installation of Ohmer fare registers, and charge a modest rental as you receive the service. You will be in no danger of ever having a lot of obsolete devices on hand. Our contracts are flexible, and we are always ready to take care of changing conditions for you.

Ohmer Fare Register Company
Dayton, Ohio



A City Type



ROLLED and FORGED GEAR BLANKS
For Electric Railway Use

THE reasons why steel Gear Blanks made by our improved methods give superior service are numerous. Let us tell you the story in detail. Then ask the opinions of satisfied users.

General Sales Office:
WIDENER BUILDING, PHILADELPHIA, PA.

District Offices:
Atlanta, Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco Salt Lake City, Seattle, St. Louis

Sole Export Representatives:
CONSOLIDATED STEEL CORPORATION
165 Broadway, New York

MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY



Announcement

THE Johnson Fare Box Co. announces the completion of its new factory at 4619-25 E. Ravenswood Avenue, Chicago. Henceforth the general offices of the company will be located at this address.

We extend to all electric railway men a sincere and cordial invitation to make our offices their headquarters whenever they are in Chicago.

Johnson Fare Box Company
4619-4625 E. Ravenswood Ave.
Chicago, Ill.

JOHNSON FARE BOXES



White Tower Truck owned by Puget Sound Traction Light and Power Co., Seattle Wash.

The MOST WORK *for the* LEAST MONEY

YEARS of service in the hands of thousands of owners throughout the country furnish convincing evidence that White Trucks do the most work for the least money.

Cost records show they have the highest operating efficiency with the lowest outlay for maintenance and repairs. Their ability to stand up and keep going assures a steady volume of performance day in and day out, year after year.

White Trucks, figured by years of service, are the most economical trucks made.

THE WHITE COMPANY
CLEVELAND

White Trucks



are the accepted standard in railway lubrication. On the great traction lines and in the big power houses these superior lubricants are demonstrating their exceptional ability to give the most satisfactory and economical service. Compounded from only the highest grade materials, they carry the extra strength and vitality that enables them to deliver maximum mileage and kilowatt hour output. Galena Service accompanies Galena Oils everywhere; it brings the personal help and cooperation of mechanical experts trained in the Galena scientific lubrication methods that have never failed to prove their value as a positive aid in securing efficient operation.

Galena-Signal Oil Company

New York *Franklin, Pa.* *Chicago*

and all principal American cities

LONDON TORONTO BUENOS AIRES MONTREAL PARIS



An Example of True Co-operation with You

When you sign with us a contract for Collier Service we recognize that that contract implies a mutuality of interest.

It is to our interest to supply your spaces with cards that will raise the whole tone of your service by making your cars cheerier, more attractive and symbols of the best in the community. Good advertising atmosphere does these things in a car just as surely as in a magazine or newspaper.

And it is to your interest to see that the continuation and continual betterment of such standards is made possible by renewing your contract with Collier Service to the end that your car card advertising may remain a source of steady, unfailing, worryless income.

That way lies co-operation or mutuality of interest.

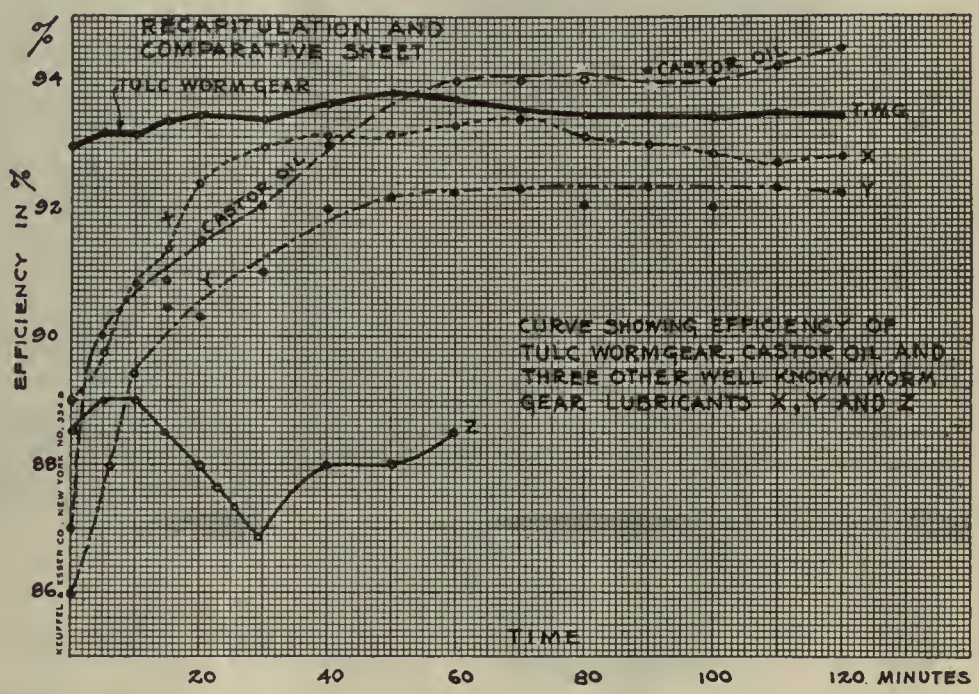


Candler Building, New York


WASHINGTON
OREGON
MONTANA
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
CALIFORNIA
ARIZONA
NEW MEXI
N.DAKOTA
S.DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISIPPI
ALABAMA
GEORGIA
FLORIDA
S.CAROLINA
N.CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
DOMINION OF CANADA
NOVA SCOTIA
49
The map above shows the location of the 49 foundries in the United States and Canada represented by the Association of Manufacturers of Chilled Car Wheels.
Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City. Ind.
Louisville.
Mt. Vernon Ill.
Ft Wayne. Ind
Birmingham
Atlanta
Savannah
Boston
Detroit
St. Paul.
Kansas City. Kan
Denver
Tacoma
Los Angeles
Rochester N.Y.
Sayre. Pa.
Lime Rock. Conn.
Albany.
Toronto.
New Glasgow N.S.
Madison. Ill
Berwick Pa.
Huntingdon. W. Va.
Wilmington. Del
Houston Tex
Hannibal Mo
Reading Pa
Baltimore
Richmond Va.
Ft William Ont.
St Thomas "
Hamilton "
Kenapo. N.Y.
Marshall Tex
Capacity
20,000
CHILLED
IRON WHEELS
Per Day
25 Million in Service
Association of Manufacturers
of Chilled Car Wheels
1229 McCormick Bldg. Chicago

—how individual lubricating service reduces lubricating costs----------

This Chart Tells the Story



The above is a recapitulation of five separate runs

Data:

Room temperature 90 degrees F.
Time of run in each case, 2 hours.
Readings taken every 10 minutes.
Machine used had Hindley Worm Drive size and speed and conditions to compare to actual commercial use.

Write for Booklet "Results"

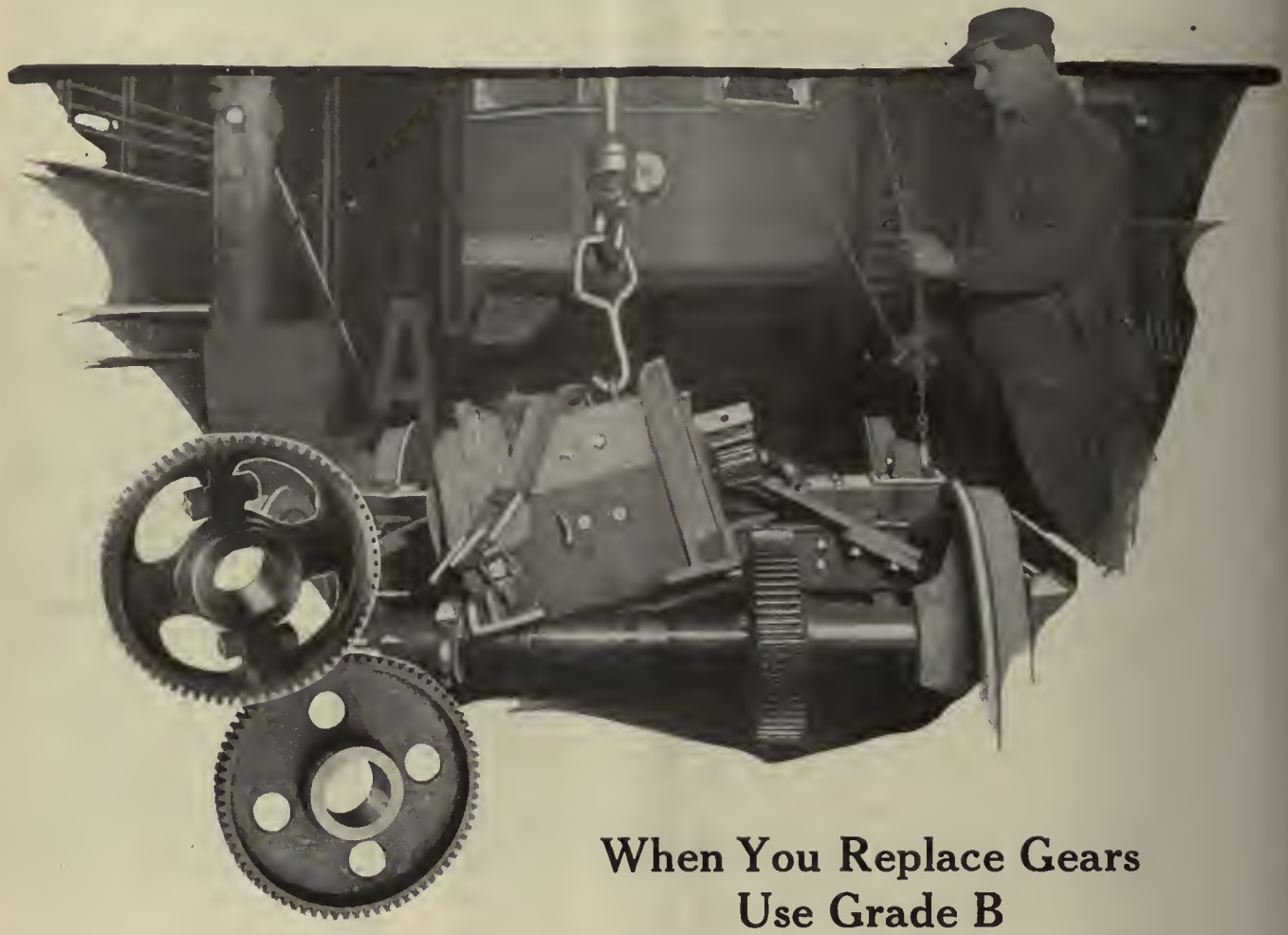
THE UNIVERSAL LUBRICATING CO.

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Another Zone System Gone by the Board

THAT the plan of the Connecticut Company and the Public Utilities Commission of Connecticut to return to a flat 7-cent fare is a blow to the zone system in this country will be denied by no one. Frankly we are sorry to see events take the turn that they have had to take in the affairs of the Connecticut Company. Particularly, after the abandonment of the zone system in New Jersey, its discontinuance in Connecticut is doubly serious, from the standpoint of those who would like to see a fair tryout in this country.

There must be a reason for this move and we believe every one in the industry, for or against a distance-tariff system in theory, is interested in what explanation may be found and what lessons may be learned.

There are, of course, many difficulties in the analysis of a problem as complex as the fare, the gross and the net of a complete and varied system such as the Connecticut Company, especially when it is at the same time experiencing severe and unregulated jitney bus competition. But there are a few points in this case which are worth the attention both of the industry and of the commissions charged with the regulation of the various companies.

In the first place, it will be recalled that the Connecticut Company, to avoid a higher flat rate fare than its 6-cent fare then in effect, installed last November a zone system of its own devising with zones of different length, depending on traffic and other features, and, on the whole, quite logical. The company prepared the public and its employees and the system was put in operation with surprising smoothness. There was but little dissatisfaction except that ever present human feeling of all of us against paying any more for any thing.

The second step was taken six months later, when the Connecticut commission, in response to complaints from suburban riders, imposed a zone system of its own on the company, making all zones equal in length. While the cash fare per zone was raised, this was tempered by the introduction of a reduced rate ticket and still further made unproductive and complicated by certain special commutation rates.

The change was an unfortunate one, as we pointed out at the time (May 1), first, because it upset a system which, if not perfect, was at least working fairly well and, second, because it substituted therefor a distance-tariff plan which was unsound in that it both complicated fare collection and was based on the theory of equal fares for equal lengths of ride, irrespective of other variables. We referred to the order at the time, also, (May 1 and 15), as one which appeared to exceed the bounds of supervisory regulation and assume more the phases and responsibilities of management.

The results during the latter half of May and all of June and July showed, according to Connecticut Company officials, a reduction of income below the corresponding period of last year, whereas under its own zone system the company had been enjoying an increase of from 17 to 23 per cent over corresponding months of the previous year and had hopes, at least, of eventually realizing a satisfactory net revenue. To add to the fare troubles, the jitneys and buses have increased many-fold, with corresponding inroads on the legitimate revenue of the railway.

Of course no one can say definitely that the earlier zone system would have proved an entire financial success, or been wholly satisfactory from an operating standpoint. It had undeniably certain elements of weakness. But for the period in which it was in use it had yielded good returns, and it was fairly easy to operate.

Finally, with so many changes in fare systems in so short a time, and with a large part of the public, with the existing zone system before it, complaining against a zone system, it is not perhaps surprising that the company, when it had to change again, decided last week to ask a return of what is practically its original system, using 7 cents in place of 5. The details of this system are given in the news columns this week.

There are two lessons in this story. One is that a zone system, to work in this country, must be right and must be administered correctly. We think the Connecticut Company's own system at least approached this condition. The other is that regulating commissions should regulate, *i.e.*, supervise, check and advise, but they should be very slow to require the adoption of unusual and experimental methods of operation, in view of the fact that they cannot assume financial responsibility in case of the failure of such plans. Much as we admire personally and professionally the Connecticut commission, we believe in this case it committed an error. It has tried to right it by granting the present 7-cent fare application of the company, but meanwhile the zone system dies without fair trial.

We are not unmindful of the other elements of the zone fare argument pro and con. This is not England. American cities have grown on the flat fare basis, though Australia has successfully made the change. People here live far from their places of employment and amusement, and one traffic route doesn't pass through several distinct communities as is common in Europe. The psychology of the public is an important element.

But income measured in dollars must go up. An increase in flat fares causes increasing private automobile traffic; it meets the opposition of those whose income has not increased in proportion to the average; it meets jitney bus competition, etc., so it seems quite logical to try to adapt to our conditions a system of charge which retains the low short-haul fare and yet fairly charges the entire riding public in such a way that the total revenue will permit satisfactory continuance and growth of service. A zone system can do this.

The Swiss Are Unique in Both Engineering and Finance

WALL Street was awakened recently by the call from across the water for a twenty-year, 8 per cent $25,000,000 bond issue for the further electrification of the Swiss Federal Railways. The high interest rate is significant. Would that American railroads might obtain loans as readily and that their net income might prove sufficient to pay 8 per cent on such an issue. Government control might assure the proper gross revenue as a result of arbitrary and immediate increase of rates, but experience during the war with soaring operating costs under government control indicated that such a solution would not produce the necessary net return. The Swiss government evidently did not profit greatly by its national credit, but paid the market price for the accommodation. The interesting feature of the deal to railroad officials is the fact that the loan was made under what would normally be considered adverse circumstances in order to reap the rewards of electrified operation and further development of water powers.

But the activities of Swiss engineers are of interest as well. In this issue some rather unique features of heavy traction are described. The determined stand taken by Swiss and Italian engineers years ago in favor of single-phase high-voltage trolley operation is further confirmed by the rather extensive addition which is now being made to their locomotive equipment. The successful solution of the problem of regenerative braking in connection with single-phase energy supply, as indicated by the engineers responsible for the designs, represents no small portion of their pioneer work.

Swiss engineers have apparently standardized the intermediate geared shaft which in turn operates the drivers through the agency of connecting rods. This is in marked contrast to the return to direct drive which has been adopted for similar service upon the new locomotives for the Chicago, Milwaukee & St. Paul Railroad. Although it is true that gear reduction and even combinations of gears and side-rod drive are in use in this country, particularly for heavy freight service, the complicated arrangement described herein which is used upon the foreign locomotives would seem to have the disadvantages of more parts to disturb the schedule as well as higher repair and maintenance costs.

The apparent solution of the gear problem by the Swiss was especially interesting. *Engineering* of London for May 28, 1920, publishes a very complete analysis of the gear troubles encountered upon the early locomotives and the method of eliminating them. In a nutshell, it seems that the two motors geared to a single countershaft were found to be swinging in a pendulum-like fashion about the countershaft as a center, thereby producing tremendous strains upon gear teeth, frame and connecting rods. After extensive tests, confirmed by calculations, a new split herringbone gear was substituted with a separate forged steel rim provided with eight radial springs. This rim is free to move about the periphery of the spider upon which it is mounted. The problem was solved, but more expensive parts were added as the result.

Thus it appears that in both financial and engineering matters the solutions of railway problems adopted by our European friends seem complicated and expensive to American engineers. However, results are being accomplished, and accomplished rapidly. An occasional reference to their methods may therefore be refreshing.

The Increase in Railroad Rates, the Interurbans and Electrification

THE Interstate Commerce Commission has spoken. And it has spoken in a manner which should bring satisfaction to every one in the transportation business. We believe the public on the whole is glad to see the railroads get a living revenue and is now chiefly concerned in seeing that the increase is not passed on five or ten fold in increased prices.

For electric railways we see two distinct benefits, even though most electric traction lines are not directly affected by the order.

One of the benefits is in the question of traction rates. There is bound to result a different psychology in transportation rates as a whole. After long study the most important rate commission in the country not only declares steam rates are too low but gives to the electric roads within its jurisdiction the right to increase their freight rates and tacitly approves also an increase in their passenger rates by saying that its order "is not to be construed as an expression of disapproval of increases, made or proposed in the regular manner, in the passenger fares of electric lines." In other words, the commission realizes that relief for the electric passenger rates will have to come largely from the individual state commissions, but promises that it will not oppose reasonable advances in interstate fares.

Undoubtedly, also, the form in which the advance for the steam roads was recommended is better for the electric lines than if all of the increase in income had been placed on freight. The latter policy was strongly advocated by a number of trunk line officials. This suggestion, however, was not accepted by the commission, and the authority to increase (in the Eastern group) passenger fares by 20 per cent and freight rates by 40 per cent with somewhat lower freight charges in the Southern, Western and Mountain Pacific Groups followed. This means, if the passenger fares are increased according to the ruling, that interurban railways will have a considerable margin in cents per mile to increase their fares until the two are equal.

Again, the principle of valuation as a basis for utility rates is helped by the decision. In fact, the rates are granted primarily upon tentative valuations made by the commission, which, incidentally, are found by groups of roads to be not greatly different from the book costs as shown by the carriers.

Another phase of the increase which is of electric railway interest is that it should advance the cause of trunk line electrification. It has been said for some time that most steam railroad officials with electrification projects did not need to be convinced of the advantages of such a step. What they needed was money, and money should now come. That the credit condition of the roads will be immediately improved seems certain. As a result it should be possible to realize some long-cherished desires to gain the many benefits of electrification.

And there is more than a mere opportunity to carry through some electrification plans. There is also a duty to do this. While the present recognition of the transportation problem may be tardy it has, at least in part, come, and the transportation world now owes it to the public to put into operation all the economies and better service features which the public has been told could not be accomplished without more money and which the public will expect now that more money is available. One of these benefits is proper electrification.

Lord Ashfield's Survey and Solution

ALTHOUGH, as its title, "London's Traffic Problem," denotes, Lord Ashfield's contribution to the May, 1920, issue of the *Nineteenth Century and After* is devoted chiefly to London, the questions discussed are, in a measure, of wider character. Furthermore, these questions are treated by a man who has had the widest practical contacts as a transportation administrator, first in the United States and then as director of the great London traffic combine itself. Whether just "Al" Stanley, Sir Albert or Lord Ashfield, we have, in him, always listened to a man whose deserved success comes largely from the faculty of looking into the future and of acting courageously upon his deductions. Indeed, in these times when the need for revenue is driving some managers to dangerous lengths in cutting service and other practices that discourage travel, it is well to recall that Lord Ashfield's success as a manager in London was built upon the theory of attracting the greatest possible amount of patronage. One may say with truth that long before town planning was a live subject, his fare and service schemes for encouraging suburban development did more in a direct, practical way than thousands of resolutions and hundreds of exhibitions by professed town planners.

Turning to Lord Ashfield's article, we find a most illuminating discussion of the need for anticipating the growth of a city rather than limping decades behind. It is many a year since the Royal Commission on London Traffic produced ponderous tomes but generated no action on the subject of traffic co-ordination and development. Instead, the work was left very largely to the operating and financial genius of this one man, who succeeded in putting under one management every private transportation undertaking in Greater London, whether tramway, underground railway or motor bus. Unfortunately, he could not go further and co-operate with the municipal undertakings of the London area. The result has been mutual strangulation. The buses, in particular, proved such obnoxious competitors by their incursions into tramway territory and their tax-free operation over tramway routes that the municipal authorities could only bide the time when changed conditions—such as the higher costs of today—would enable them to marshal public sentiment against increases in fare. So, too, the necessity for conserving its own enormous investments naturally led the Traffic Combine (as it is locally dubbed) to oppose any municipal work that would cut into or duplicate its own services. And, to make matters worse, there are jealousies aplenty among the political sub-divisions themselves. All of which accounts for the haphazard conditions of today and the likelihood of a stalemate so long as these conflicting interests continue.

Lord Ashfield believes that the best way out is co-ordination under one management of all private and public transportation facilities with a wide degree of public regulation of such management. He would have such a co-ordinated system operate on a commercial, even on a competitive basis, so that the public would get the most efficient use of all the facilities available without precluding a worthy reward to the organization that handled an undertaking of such consequence to the public welfare.

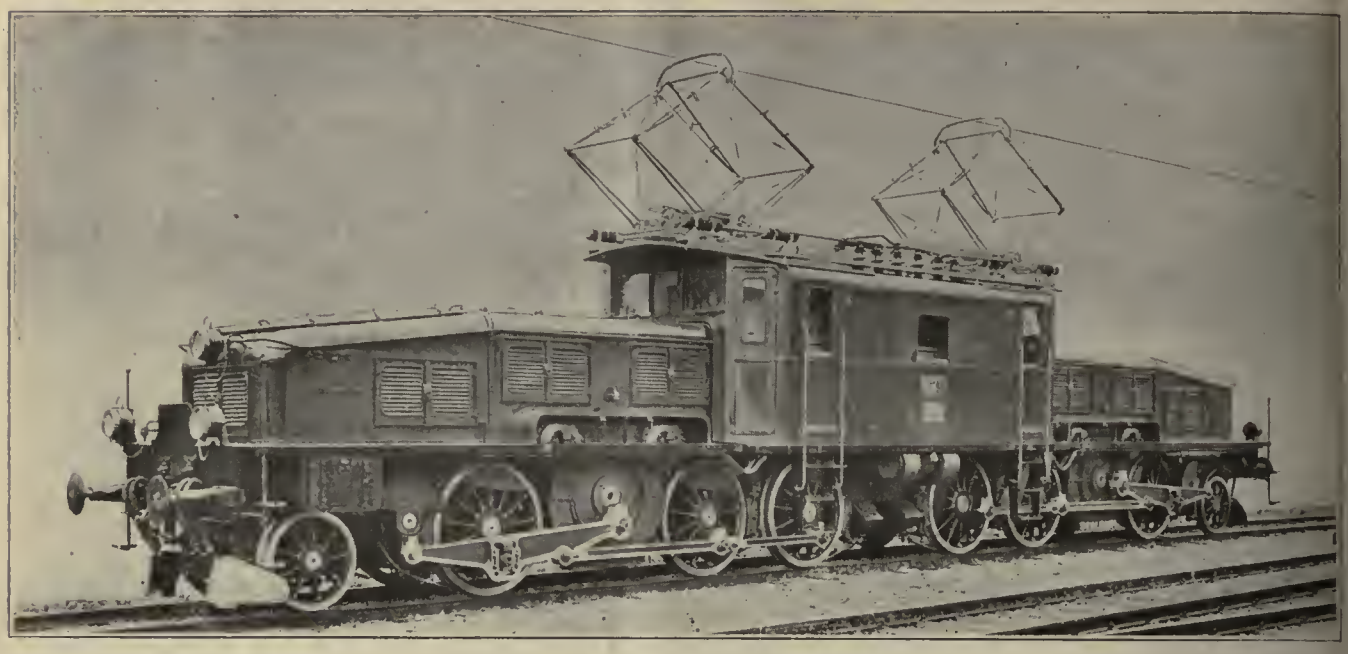
From our own experience with regulators who evade accepting the consequences of their regulations, we are not quite so hopeful about satisfactory co-operation between private operators and public controllers. Judging by our own history, we would say that the trend is toward service-at-cost operation in which the difference between the rate of return and ordinary bank interest will represent a reward for operating ability. The day of the great *entrepreneur* and of large profits in transportation development is gone, never to return, but so large are the opportunities in *conducting* transportation enterprises that no important city can afford to ignore any plan which would combine the money-making incentive of private enterprise with the welfare-making incentive of public enterprise. Men of the type of Lord Ashfield are surely as entitled to liberal rewards for their ability as are capable directors in far less important lines of endeavor. The day may be near when managements will be rewarded chiefly upon the basis of increasing usefulness to the community.

How the Bus and Tram Compare in Cost

WE HAVE purposely discussed the last part of Lord Ashfield's article first because it would serve to illuminate his comments on the respective fields of the means of transit—the street car, the non-surface car and the bus. Of the street car he says: "The tramway is accepted as the most efficient means of local communication in well-developed cities of a diameter not exceeding 10 to 12 miles." Even for London, in comparing the cost per seat-mile of each class of transportation his cost indices are 44 for a train to 27 for the seventy-eight-seat car and 43 for the very latest London bus of forty-six-seat capacity. He says, however, that the economic advantage of the tram is lost by the operation of lightly loaded units throughout the day. This condition, we believe, could be ameliorated by the operation of one-man cars for the base schedules. Indeed, Lord Ashfield himself says of American practice that one-man cars equipped with safety devices are being freely adopted and present advantages which must always seem denied to a motor omnibus. These and other means make tramways more effective, he says, but of course do not solve the capacity problems, which are better handled by rapid transit routes.

In comparing specifically motor bus versus tram in the London district, Lord Ashfield makes the point that the municipal authorities have often confused street widening with tramway development, so that the cost of the tramways is very high in the end. But this is not all.

While the motor bus in London has been operating free from street widening, paving taxes and the like, the London County Council Tramways have had the two-fold burden of taxation and extraordinarily high fixed charges because of so many obligatory miles of conduit construction. Then consider that the motor buses work from the rich, short-haul territory outward, while the tramways work from the thin, long-haul territory inward, and with but one real entrance into London's richest district. Under the circumstances, there can be no real comparison of bus and tram in London, but conciliation there must be, else the public loses doubly in the depreciation of transportation securities and demoralization of transportation service. Each side having "carried on" to the point of exhaustion, it is high time that competition should be succeeded by some sort of unified and co-operative management as set forth so ably by Lord Ashfield.



LATEST 1-C+C-1 FREIGHT LOCOMOTIVE

Swiss Federal Railways Buys New Electric Locomotives

Details Are Now Available Regarding the Unique Construction of the New Single-Phase Freight Locomotives Manufactured by the Oerlikon Company—Recent $25,000,000 American Loan Used for Purchase

INTEREST in railway and financial circles has recently been centered upon the $25,000,000 loan placed in this country by the Swiss Federal Railways for the purpose of extending and equipping their electrified section.

It will be recalled that electric traction was adopted upon the Swiss Federal Railways several years before the war. As a result of successful operation upon the Swiss Federal Railways, including Bern, Loetschberg and Simplon, and carefully prepared calculations and estimates based upon local conditions, it was decided during the war to convert an important section of the St. Gothard line, that between Erstfeld and Bellinzona, part of the main line from Switzerland to Italy, for operation as a 15,000-volt, 16⅔-cycle, single-phase trolley railroad.

Several types of locomotives were proposed and tried experimentally for both express and freight service. Four of the original test locomotives ordered in May, 1917, were described by Prof. Hugo Studer of Zurich, Switzerland, in the ELECTRIC RAILWAY JOURNAL, Sept. 7, 1918, page 411. In this article the freight locomotives are described in particular.

In March, 1919, the Swiss Federal Railways, which is electrifying its lines, placed a large order for electric freight locomotives for use upon the St. Gothard section of this system with the Oerlikon Company of Switzerland. Later, in the fall of 1919 and early this year, twenty-three additional units have been placed on order with the latter company, the delivery of ten of which has already begun. The Swiss Winterthur Locomotive & Machine Works co-operated in the mechanical design and construction.

The conditions under which these freight locomotives are expected to operate are particularly severe. Upon the Gothard Railroad between Goldau and Chiasso, a distance of 122 miles over which these locomotives are expected to operate, there is a difference in elevation of 5,100 feet, representing an average grade of nearly 1 per cent. The maximum grade is 2.6 per cent. The locomotives are scheduled to haul an 860-ton train over this distance and return in twenty-eight hours, allowing fifteen minutes at each terminus. Upon a portion of this run between Chiasso and Bellinzona the train load for a single 1-C+C-1 locomotive will be reduced to 625 tons. The temperature of no important electrical part is to exceed that specified in the standardization rules of the A.I.E.E. during this service. With loads of 430 tons a speed of 22 miles per hour is to be maintained upon the maximum grade of 2.6 per cent, while upon the same grade with a 300-ton load the trains are scheduled for 31 miles per hour. On grades over 1 per cent pusher locomotives will be used.

Their rating for continuous service is 1,250 kw., with overloads provided for one and one-half and one-quarter hours of 1,620 and 1,850 kw. respectively. Upon the maximum grade the locomotive must be capable of exerting 20 per cent excess power, either as the result of an increased torque, because of the necessity of operating at increased speed, or a simultaneous combined demand for both excess speed and torque. A torque sufficient to start a 430-ton train upon a 2.6 per cent

grade and to accelerate to a speed of 22 m.p.h. in four minutes is specified. This corresponds to a rate of acceleration of approximately 0.09 m.p.h.p.s. With a 300-ton load a speed of 31 m.p.h. must be attained with an acceleration of 0.13 m.p.h.p.s. As the maximum speed rating is 40 m.p.h., upon a 1 per cent grade with a 300-ton train, it is practicable to operate passenger and express service upon mountain grades with the same equipment. The maximum starting tractive effort at drivers is 53,400 lb. Further details regarding the operating characteristics of these units will be found in accompanying curves.

Mechanical Construction

As will be seen from the accompanying illustration of the 1-C+C-1 type of freight locomotive a rather unusual frame construction has been adopted. Although two distinct interchangeable trucks, articulated at the center of the complete locomotive, are used, yet but one small cab is employed, which is located in the central third of the entire structure. Upon the top of this cab are mounted, with proper insulation for 15,000-volt service, the two pantograph bow current collectors. These are raised into position upon the contact wire by means of air pressure controlled from the operator's position in the cab. This cab is supported upon the inner ends of both truck frames by two spring pressure plates mounted within the truck frame upon each side of a pivot bearing. One of these pivot bearings is fixed permanently in the truck frame, while the other has a limited longitudinal motion, so that no pull can be transmitted through the frame of the cab.

The ventilated motor housings shown in the illustration to occupy the outer ends of the two trucks are fastened rigidly to the truck frames. These hoods are sufficiently low not to interfere with the view of the engineer and are provided with the necessary side and top openings for inspection purposes. In fact, the motors located under these hoods can be inspected during operation by uncovering an opening and looking through small windows in the cab. The housings are readily lifted off the truck frames for repairs to the motors or other auxiliary equipment. The cab proper overlaps the end housings, giving the appearance of a single continuous superstructure. The construction also prevents the entrance of rain and snow.

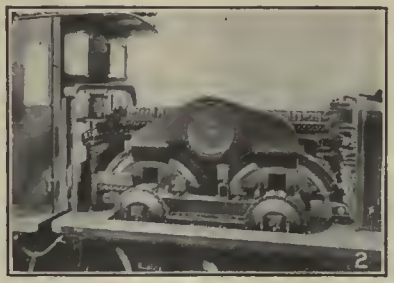
Each truck comprises three pairs of coupled drivers and a pony axle. The usual method of spring suspension of the truck frames has been adopted. In order to equalize the axle pressures, however, the supporting springs of the first driving axle are connected to the pony axle with a compensating lever, while the second and third drive axles are connected in a similar manner. The middle driving axle of each truck is provided with a side play of 1 in., while the pony axle is free to move transversely through a range of 3¼ in. This is to provide better tracking on curves. Upon re-entering tangent track from a curve the pony or leading axle is returned to its mid-position by the action of leaf springs. The truck frames are connected by means of a powerful short coupler containing a leaf spring element for the purpose of transmitting compression and tension forces from one truck frame to the other.

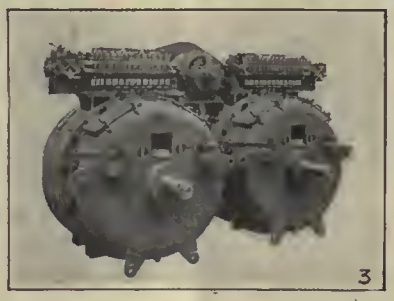
One pair of motors is mounted directly upon each truck frame between the first and second driving axles. Pinions upon either end of the motor shafts engage gears with crank pins. A triangular connecting rod transmits the power from the crank pin of the gear to the forward driver through the agency of a sliding journal. The end bearing of this connecting rod is flexibly supported from the truck frame at a point slightly ahead of the first driver. The motion of this countershaft bearing is limited by a heavy spring. The two other drivers are operated by means of horizontal side rods which articulate with a driving pin upon the triangular connecting rod. This rather complicated driving mechanism will be apparent from an inspection of the illustration.

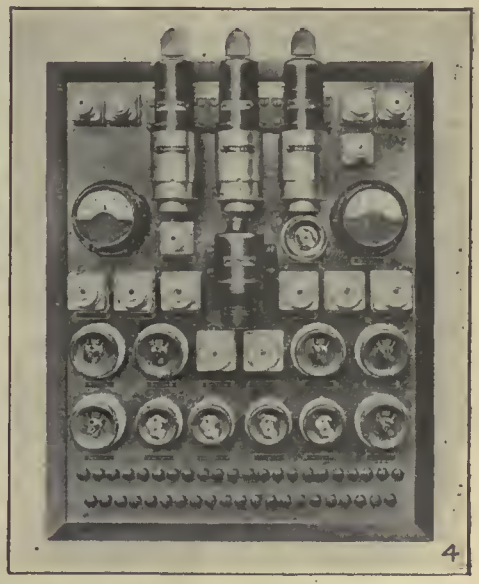
Electrical Equipment

The cab, centrally located in this type of locomotive, provides the most convenient mounting for the transformer, which is of the oil-insulated, air-cooled, outdoor type. The laminated iron core is so stacked and the transformer tank so designed as to form a central vertical shaft, open at top and bottom, through which air is circulated for cooling purposes by means of motor-operated fans. The cover of the transformer is really





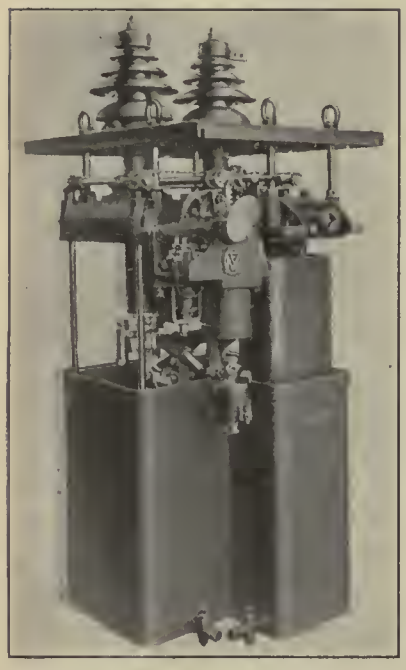




1. The engineer has unobstructed view ahead. The control is at his left side.
2. Two motors with inclosed pinions and gears are used per truck.
3. Control switches are located over motors under the end hoods of both trucks.
4. Overload and no-voltage relays are mounted upon control panels.

a part of the roof of the cab. The latter, however, is so designed as to permit the ready removal or repair of the transformer from the top, if necessary, when the current collectors are raised.

The transformer is designed for operation at either 7,500 or 15,000 volts at 16⅔ cycles. It is understood that a change will be made from 7,500 volts to 15,000 volts after the complete conversion has been made from steam to electrical operation. Variations in voltage up to 15 per cent may be permitted without serious operating difficulties by means of potential taps upon the low-voltage side. A rather unusual feature of the transformer winding is the provision of two distinct secondary circuits, one supplying the driving motors and the auxiliary equipment of the locomotive, while the other is connected to the heating circuit of the train. The former, or motor secondary, is made up of two coils equally distributed upon the two legs of the core and tapped at twenty-one different points. Twelve leads from these taps are carried out through the lower portion of the case to the tap switch as indicated in the outside view of the transformer. The two coils are normally connected in series with the middle point grounded. Each is wound for a maximum voltage of 567.



THE OIL SWITCH FORMS A PART OF THE CAB ROOF

Compensated Motors Are Used

The motors, four in number for the complete locomotive, are provided with series compensated windings with commutating field coils. They are rated at 550 hp. at drivers for one and one-half hours when operating at a voltage of 400 and a speed of 560 r.p.m. At 380 volts, other conditions being unchanged, the rating is 425 hp. The frames are semi-enclosed and forced ventilation is employed. As twelve poles are provided a corresponding number of sets of carbon brushes are mounted upon a cast-steel ring so designed as to provide for the shifting of the brushes upon the commutator. Open slots are used in the stator core, while those in the rotor are partially closed. An attempt has been made to avoid wave-form distortion by skewing the slots around the periphery of the rotor. Although resistance leads were used between the rotor coils and the commutator bars in former designs they have been omitted in the later types.

Speed Controlled by Voltage Variation

The principle used in controlling the speed of the locomotive is that of varying the voltage supplied to the motors by changing the taps upon the secondary winding of the transformer.

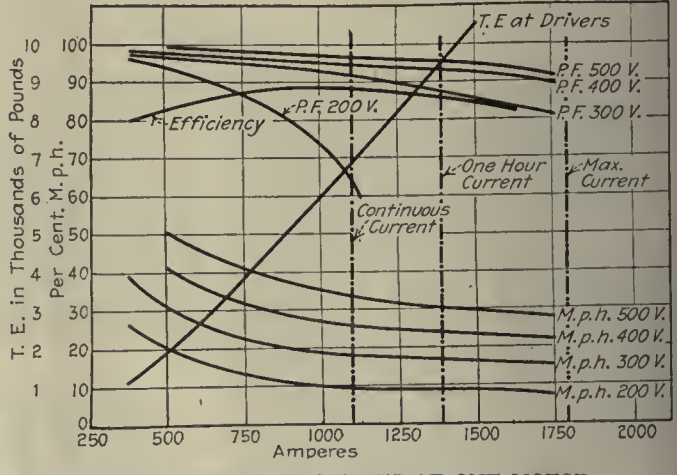
Two different types of tap switches are used, one for hand operation and one for pilot motor operation. The succession of connections is the same in both. The manual switch is provided with a cam-shaft which actuates contact levers with pressure contacts and a central magnetic blowout. This switch was developed for easy manual operation as the friction of the motor-operated switch proved too great. The motor-operated switch is of the drum type similar to those developed for the Loetschberg locomotives, except that in the new switch the two drums are located one over the other and the pilot motor, instead of running all the time, operates only when the drivers are in motion.

In addition to the two transformer tap switches previously described a control switch is mounted upon each motor frame. This furnishes two running points, two for regenerative braking and one "off" position. The four running points are manipulated pneumatically, but in case of emergency they may be controlled by hand. The "off" position can be manipulated only by hand.

Regenerative Braking Is Adopted

One of the early forceful arguments against the single-phase system was the difficulty with which regenerative braking was accomplished. The advantages of such control upon down grades, including the elimination of wear upon wheels and brakeshoes, the absence of metallic dust, the saving of energy and the smoothness of retardation need no further elaboration. It is claimed that these advantages are now available with the single-phase system with but little added complication. One additional choke coil is included in the main line and a smaller one is connected in parallel with the commutating-pole windings during regenerative operation. The controllers and tap switches previously described are common to both running and braking circuits. The change of connections to the braking circuit is accomplished by means of a reversing switch.

Upon starting down a grade where regenerative braking is to be used the tap switch is first moved to the "off" position. The reversing switch is then thrown to the braking notch. The position of the running controller handle then determines the speed by changing the voltage impressed upon the motors. The speed range is the same as that available when running under power. This braking system also permits continued application until the locomotive comes to rest. It is claimed for this system by the manufacturers that



CHARACTERISTIC CURVES OF ONE MOTOR

Gear ratio, 4.03; drivers, 53¾ in. diameter; frequency cycles, 14.3

regenerative operation at the highest speeds is possible without causing sparking at the commutators or harmful disturbance in the system, nor is the braking process materially affected by fluctuations of voltage and frequency. In fact the full braking power may be interrupted suddenly without harmful results by the automatic opening of the high-tension oil switch as the result of the current collector leaving the contact wire.

After the braking operation is concluded the master controller and thence the tap switch are placed upon the "zero" position. After the reversing switch is then placed in the forward running position, normal operation is again possible. All switching operations are interlocked in such a manner that an incorrect sequence of switching is said to be impossible in both running and braking processes.

The efficiency of regenerative braking is claimed to be approximately 75 per cent under normal operating conditions. However, the power factor of the returned energy is low, ranging from 50 to 70 per cent.

The regenerative braking system is supplemented by the usual hand and air-brake equipment, consisting of a pair of brakeshoes for each pair of driving axles. A 15-in. brake cylinder is installed upon each truck. The air brake provides a maximum braking force equivalent to 80 per cent of the total adhesion weight of the locomotive. On each truck four sand boxes are mounted, two in front and two behind the coupled drivers.

Current Collector Is Unique

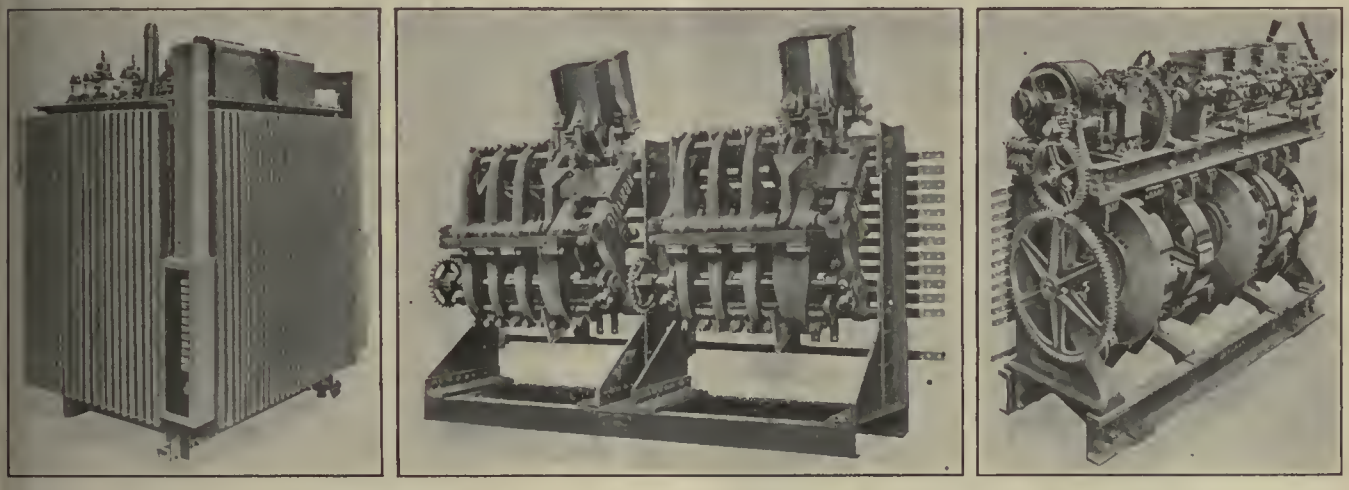
Each of the high-voltage current collectors is designed to carry the full current of the locomotive at the lower operating voltage. The second collector is therefore merely a reserve unit. The long radius arm used upon the current collecting mechanism permits considerable variation in height of the contact wire without corresponding movements in the pneumatically operated pantograph. The pressure of the shoe upon the contact wire is practically constant for all heights from 16 to 23 ft. of the latter above the rail. Both collectors may be raised from either control position within the cab by means of air pressure, the motion being so damped as to provide smooth and quiet operation at all temperatures. To provide for the possibility of raising the pantographs after long idleness, when no compressed air is available, a hand air pump is installed with which the necessary air pressure can be secured in less than one minute. The ladder leading to the top of the cab is pneumatically interlocked with the pantograph operating mechanism, so that no one can mount the ladder with the apparatus upon the top of the cab at high voltage. The entire roof equipment is subjected to ten successive tests at 60,000 volts, *i.e.*, four times normal operating voltage, for a period of thirty seconds at intervals of five minutes. During this test the parts normally grounded are connected to ground.

Between the current collectors and the main oil switch two high-voltage disconnecting switches are inserted which may be operated from within the cab to disconnect a damaged current collector.

Protective Devices Employed

Like the transformer, the main oil switch is so constructed that its cover forms part of the cab roof, thus concentrating the high-voltage parts at the center of the cab, well out of reach. The grounding switch, contrary to the usual custom, is located inside the transformer case. In the whole locomotive there is no high-voltage conductor or terminal exposed in such a way that it may be touched either by mistake or in performing the duties incident to the operation of the locomotive.

The main switch can be operated pneumatically from both cabs. Manual operation is also possible in case of emergency. This switch is opened automatically by either one of two overload relays in the motor circuits and one in the transformer circuit. A no-voltage relay connected to the low-voltage side of the transformer opens the switch when the power supply is interrupted.



AT LEFT, LOCATION OF TRANSFORMER TAPS INDICATED. IN CENTER, THE TAP SWITCH IS CONNECTED TO SECONDARY WINDING BY END LUGS. AT RIGHT, THE PILOT MOTOR TAP SWITCH MAY BE OPERATED BY HAND IF NECESSARY

DATA ON 1-C+C-1 FREIGHT LOCOMOTIVE

Height	12 ft. 5 in.
Total length	63 ft. 6 in.
Wheelbase length	54 ft.
Wheelbase of truck	22 ft.
Fixed wheelbase of truck	15 ft. 5 in.
Width of locomotive	9 ft. 8 in.
Gage	4 ft. 8½ in.
Cab length	19 ft. 2 in.
Height contact wire (maximum)	23 ft.
Driver diameter	53¼ in.
Crank pin stroke	23⅝ in.
Transmission ratio	4.03
Weight, mechanical parts	141,200 lb.
Weight, electrical parts	112,800 lb.
Total weight, locomotive	256,000 lb.
Adhesive weight	208,000 lb.
Axle loads 24,000 + 36,400 + (4 × 33,800) + 36,400 + 24,000 lb. respectively.	

Additional protection against personal accidents is provided by a system of interlocking devices connected with the oil tank of the main high-voltage switch. For example, this tank is so arranged that it cannot be removed when air is supplied to the air line of the pantograph cylinder or when the grounding switch is closed.

In order to protect the locomotive from the application of sudden abnormal voltages due to surges or lightning, a choks coil is mounted upon insulators upon the top of the transformer and connected in series with the main high-voltage circuit near the pantograph current collectors. Previous experience has demonstrated that further protection is unnecessary upon the locomotive. It is considered better and sufficient to protect each section of the distribution system with excess voltage protective apparatus.

For the protection of the motors and transformer from excessive current when the process of regenerative braking brings the locomotive to a standstill an additional choke coil is inserted in the circuit of each pair of motors.

Unusual Provisions for Train Heating

Provisions made for locomotive and train heating are rather unusual. As previously stated, the main transformer is equipped with two secondary windings. One of these, entirely independent of the motor and auxiliary circuits, supplies a voltage of from 800 to 1,180 volts, with adjustable taps for a heating circuit. This circuit extends through an oil switch and coupler connections to the train. It is designed to supply for heating purposes 400 kw. of power at 1,000 volts or a maximum of 480 kw. at 1,180 volts during the preliminary heating process when cars are cold. During this period it is expected that the transformer will not be called upon to supply energy to the driving motors.

Railway officials and designing engineers will be interested to learn more about the results of operation of these rather unique locomotives upon single-phase lines at high voltage. Service under similar conditions of grade and heavy freight traffic has not been undertaken in this country with single-phase motors and time only will indicate the adequacy of the design and construction described.

All Cars in Service

OVER the Decoration Day holidays, from May 29 to June 1, and the Fourth of July holidays, from July 3 to July 5, the Long Island Railroad had all of its electrically equipped cars in service. This company owns 474 motor cars and 90 trailers. In order to accomplish this, it was necessary that extreme care be used in making repairs and on inspection to make certain that all parts of the equipment were in proper condition for continued operation and also that all other departments concerned co-operate. Credit is due the transportation department for its careful handling of trains, which prevented any serious accident to cars which might have resulted in their being damaged and withheld from service.

The passenger service on the Long Island Railroad has exceeded all previous records during this season and all departments have been impressed with the necessity of keeping all available equipment in service. This record over the holidays is particularly noteworthy, as it was accomplished with but a very small amount of overtime.

New Type of Gear on Swiss Locomotives*

AN INTERESTING problem in gear reduction has been recently solved in connection with an experimental electric locomotive for the Bernese Alpine Railway Company in Switzerland. Gears for the locomotives of this company have in the past been furnished by the Citröen Gear Company, but during the war they were produced by a German manufacturer under license.

It will be remembered that these locomotives are equipped with two motors each, mounted near the center of the locomotive considerably above the floor, and geared to an intermediate shaft carrying crank plates, pins and connecting rods. The pinions of this drive, of 2 ft. 2⅞ in. diameter and 9⅛ in. width, are of highest test forged steel, keyed to the rotor shaft. These mesh with special herringbone gears 4 ft. 11¼ in. in diameter, which consist of cast steel hubs, upon which are shrunk forged steel rims.

Although these locomotives operated successfully during test runs up to speeds of 24.5 m.p.h., the operating conditions at higher speeds at a later date developed a peculiar vibration of the whole locomotive frame, which seemed to be particularly severe throughout a critical range of speed from 24.5 to 25.7 m.p.h., although above and below this speed the phenomenon ceased. This seemed to indicate that the difficulty was due to some resonant vibration at a critical frequency, dependent upon the design of the locomotive frame.

Upon further detailed investigation, during road tests, it was found that the centers of the motor shafts were vibrating with a pendulum-like motion about the intermediate shaft as a center, first toward and then away from each other, with a maximum amplitude of nearly ¼ in. As the locomotive motors were mounted rigidly upon the frame plate, this indicated that the latter was itself in vibration. Such a motion was necessarily in the same direction of rotation as one rotor and opposed to that of the other rotor, and consequently excessive stresses were set up in the connecting rods, causing several to be broken.

Before the true cause of the broken connecting rods had been discovered they were sufficiently strengthened to resist the internal stresses, but the vibration still continued. The difficulty was finally overcome by the installation of special gears provided with rims free to move in either direction, about the shaft as a center, upon the steel spider as a base. Eight groups of radial laminated springs, mounted upon the spider and extending outward into recesses in the rim, limit the movement of the latter. They are so designed, however, as to permit motion in either direction circumferentially with respect to the shaft. It was at first considered necessary to equip both motors of each locomotive with such gears, but one only was found, upon trial, to suffice. No difficulty has been experienced at any speed since these new gears were installed.

An instructive forty-page pamphlet has recently been published by the Illinois Committee on Public Utility Information. It is a treatise by William Keily, giving in authoritative but brief form the history of the application of electricity to industrial purposes and a summary of the present situation. Considerable attention is given to the electric railway, and a plea is made for fair play for the "burden bearer."

*Abstracted from *Engineering* (London).

High-Voltage Insulator Development Indicated at Portland Convention

Several Excellent Papers Presented at the Pacific Coast Convention, A. I. E. E., Show Changes Necessary in Suspension Insulators to Adapt Them for 220-Kv. Service

THE following are the principal causes of failure of the conventional type of suspension insulator unit and to some extent the multi-shell pin-type unit, according to W. D. A. Peaslee in a paper entitled "Factors Controlling the Design and Selection of Suspension Insulators"[1]: (1) The use of materials having widely different coefficients of cubical expansion, as in conventional cap-and-pin construction, which cause enormous stresses under temperature changes; (2) mechanical overloading; (3) shocks such as shooting; (4) lightning and power arcs; (5) actual electrical puncture; (6) leakage under adverse conditions, followed by flash-over and heavy power arc; (7) porosity.

The author supports the use of porcelain in tension and draws the analogy to the use of cast iron in a similar manner in many designs in place of steel, which is known to be much stronger in tension. A mechanical strength of from 9,000 to 10,000 lb. is considered adequate for a suspension unit up to 150 kv. operation if the unit is so designed that the repeated mechanical stresses do not injure the unit electrically.

The design of hardware must be a compromise between ease of assembly and security of the connection against failure or uncoupling. The author feels that in order to take advantage of a symmetrical design, conforming in outline as nearly as possible to the lines of force in the electrostatic field surrounding the insulator to avoid corona formation at too low a voltage, a departure will have to be made in the method of attaching the hardware to the porcelain.

Losses due to the absorption of moisture by the porcelain are considered rather serious, due to the resulting localized internal heating of the insulator produced by leakage current. It is disconcerting to read that "good glazing postpones the deterioration of porous porcelain but cannot eliminate it." The statement is challenged, which is said to be quoted from another manufacturer, to the effect that "a low moisture absorption is desirable, but it must not be assumed that any satisfactory porcelain can be made which will have zero absorption."

Attention is again directed toward the importance of puncture tests of insulators. The value of such tests has been a matter of controversy for years, involving widely varying opinions. Owing to the high time lag of highly damped, high-frequency transient voltages encountered upon transmission lines, it is predicted that the fundamental basis for the design of a rational suspension insulator unit should be to make the puncture voltage about three times the dry flash-over voltage.

The prevention of corona upon an insulator at relatively low voltages is advocated, and the necessity of adding extra units of high insulating value in some cases to prevent corona forming on the line units is quoted as an argument in favor of designs having higher corona-forming voltages.

[1] *Journal* A. I. E. E., June, 1920, page 571.

A rather radical departure in the design and manufacture of suspension units is proposed which is illustrated on page 262. It will be noted that an attempt has been made to reduce the large mass of metal and its tendency to introduce thermal strains in the porcelain by the use of a spider construction embedded in the porcelain by means of a special alloy said to have sensibly the same cubical expansion as porcelain. One is immediately impressed with the relatively large mass of porcelain in this new unit, but improvements in manufacture are said to have been developed to overcome the weakness associated in the past with such a type. Tests both in laboratory and of a routine factory nature are outlined to substantiate the claims for this new design.

ELECTRICAL CHARACTERISTICS OF THE SUSPENSION INSULATOR[2]

A second paper upon this subject was presented by F. W. Peek, Jr., which points out in particular the comparison between the duties of the suspension insulator at voltages above 100 kv. with those imposed at lower voltages. That the deterioration experienced in line insulators after a few years of good service is due largely to mechanical causes is conclusively shown by the fact that many old types of insulators made of porcelain known to be inferior to that manufactured at present, but supplied with loose-fitting hardware, have shown a much better life record than modern designs.



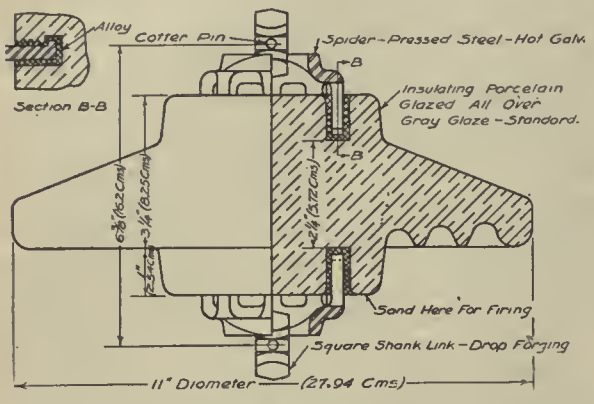
ANTENNA SHIELD FOR EQUALIZING VOLTAGE ON INSULATORS

The solution of the deterioration problem seems to be to start with a design as free as possible from expansion troubles and the selection of a tough, non-porous porcelain. Years of service have been the best criterion of design. Regarding the selection of material, no present electrical test will anticipate future cracking due to internal strains or brittle porcelain or will indicate porosity in dry porcelain. The desired results

[2] *Journal* A. I. E. E., July, 1920, page 623.

can probably best be attained by testing a small percentage of the product to destruction from day to day after the usual electrical and inspection tests have been made, the object being to determine if the product is up to the standard and of uniform quality. The idea is not new, but is used in the manufacture of lamps and in other industries.

Electrical, mechanical and porosity uniformity tests are necessary. Extremely accurate tests are not necessary, but it is necessary to have tests that can be quickly



THE PROPOSED SUSPENSION UNIT WITH SPIDER CONSTRUCTION

made so that any fault can at once be detected and remedied.

Passing to the question of extra high voltage problems, the tendency of the unit nearest the line to absorb a constant percentage of the line voltage regardless of the number of units in the string is clearly noted from the test data. For example, in strings of over five units in length from 20 to 30 per cent of the line voltage is impressed upon the unit nearest the line wire. The variation indicated is due to different designs of insulator and hardware. Thus at 220 kv. the stress upon the line unit will reach the rather undesirable value of 38 kv. This objectionable value may be reduced by any one of the following methods:

1. Increase the capacity of the units without increasing the capacities from the various sets of hardware to ground.

2. Increase the capacity of the various units along the string in proportion to the currents flowing through them. This means the highest capacity upon the line unit, less on the next unit, etc. This is generally called grading.

3. Elimination of the ground capacities by means of antenna shield from the line. This may be called shielding.

The first two of these methods have been used considerably in the past. The third, which is brought about by means of a specially designed shield, is illustrated in the photograph. The results obtained with and without the shield are seen to be very creditable from the curves which have been reproduced herewith from the original paper. This result is expressed in a more forceful manner in the statement that "the maximum unit stress would be less upon a 220-kv. shielded string than on present non-shielded strings operating successfully at 100 kv. and less."

The effects of rain, dirt, corona discharge at high voltages upon both graded and ungraded strings are then described, with the conclusion that the use of shielding is likely to be more generally effective at extra high voltages than grading. Grading has the further disadvantage of requiring special units which must be kept in proper proportions for replacements.

An interesting method of measuring the voltage between the various units and ground is described in which such voltages are balanced against those existing upon the various taps of a water resistance connected between line wire and ground.

It was concluded that:

1. The old method of basing everything on electrical tests should be abandoned. Severe electrical tests are often harmful. The electrical strength is often secondary to other characteristics.

2. For the very high voltage lines that are at present being considered, greater reliability may in many respects be anticipated than for the lower voltage lines. The lightning arc-over voltage and dielectric strength will be relatively higher, and indeed lightning voltages, sufficient to cause arc-over, will be less than on low-voltage lines. Increasing the number of units decreases the probability of complete string failure.

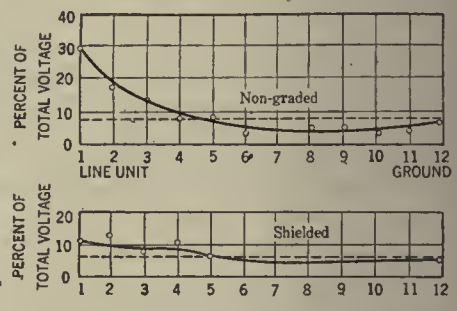
3. Uneven distribution can be corrected by shielding. Shielding prevents excessive corona on the line end units and tends to direct the power arc away from the string.

4. Briefly, outages due to insulator troubles will probably be less frequent at the higher voltages than at present.

Unit Voltage Duties in Long Suspension Insulators[3]

A paper bearing this title was presented by Harris J. Ryan and Henry H. Henline, which sets forth some very interesting tests made at Leland Stanford, Jr., University. These tests involved varying numbers of suspension units per string, with and without shielding rings.

In order to study more fully the various voltage stresses upon the units of a string, a convenient ratio of maximum to average voltage for a string has been adopted. A standard string of 10-in. "bomb and link type units" is used to establish an empirical curve plotted between this voltage ratio and the number of units in a string. With this as a basis an equation is derived which may be used to determine the maximum voltage duty of cap and pin units at voltages not yet used in practice.



VOLTAGE DISTRIBUTION ON A STRING OF TWELVE INSULATORS
(Laboratory hardware)

For example, "when used to support and insulate a 220-kv. line a thirteen-unit cap and pin string would operate at maximum and average unit voltage duties of 25 and 10 kv. respectively. Many engineers feel that a duty of 25 kv. for a single 10-in. cap and pin type unit is too high because of corona formation and the injury to hardware and porcelain that may result, likewise because of the low factor of safety against flash-over by cascading. It is generally conceded, therefore, that in the present state of the art

[3] *Journal* A. I. E. E., July, 1920, page 631.

some additional means must be employed in suspension insulators for the 220 or 250-kv. lines whereby the maximum unit duties will not be excessive compared with those of present practice."

Results obtained by Dr. Leonard F. Fuller and one of the authors of this paper are quoted to show the reduction of maximum unit voltage duty for a double unshielded string for 220-kv. service from 23.5 to 15.5 kv. as compared with a single unshielded string and to 10 kv. for a double string equipped with static shields.

Test results quoted in this paper are confined to combinations of insulators of present standard manufacture for the very definite reasons stated as follows:

"Not until the manufacturer has amply demonstrated his immediate readiness to deliver by economic quantity production durable units in which radical changes have been made in design, size and rated mechanical and electrical duty, can the transmission engineer count upon the use of units that may thus differ materially from those in use at present for the support of extra high-voltage (220-kv.) power lines.

"Suspension insulators in common use can be satisfactorily employed for the make-up of insulators for 250-kilovolt lines.

"Increase in the number of strings in the suspension insulator will permit the use of a limited increase in line voltage.

"Static shields in requisite forms will lower maximum unit voltage duties so as to permit the satisfactory insulation of lines for the use of voltages far above 150 kv."

City Buys Lines in Berlin

Surface Railway System Badly Run Down and Fares Three Times Pre-War Figures Conditions Which Led to Purchase

BY E. C. ZEHME
Privatdozent at the Technische Hochschule, Berlin

THE system of the Grosse Berliner Strassenbahn was sold to the city of Berlin and neighboring municipalities as of July 17, 1919. The experts for the city had valued the property at 104,000,000 marks, while the company had raised its first figure of 198,000,000 marks to 349,000,000 marks! The latter price undoubtedly was excessive in view of the depreciated condition of the property. The associated municipalities, which may be considered to form the metropolitan district of Berlin, would have been obliged to pay 150,000,000 marks had they waited until the expiration of the grant in 1925. They offered 137,000,000 marks in view of the fact that 40 per cent of the track and much of the rolling stock demanded immediate replacement. They had also declared that if the company stayed in business they would not permit the continuance of the 17.5 pfennig fare (the original pre-war fare was 10 pfennigs), but would insist upon a return to a 12.5 pfennig fare, thereby forcing a decline in the shares and value of the property. Furthermore, a nationalization measure then under way would have led to almost any price the government saw fit to pay. So the municipalities' offer was accepted as a matter of necessity.

This purchase has ended a tenacious struggle of long standing between the community and the company. During the course of this struggle the city of Berlin had built some competing street railways, but neither these railways nor the lines of the Berlin Elevated & Underground Railway had proved sufficient to meet the growth of traffic, as may be deduced from the accompanying table.

The total number of passengers carried on the Grosse Berliner system in 1917 was 896,000,000.

MUNICIPALIZATION HAS NOT REDUCED FARES

The hope that municipalization would lead to a reduction in fare has not been fulfilled. Instead of a reduction to 12.5 pfennig, the fares were raised first to 20 pfennigs, then to 30 pfennigs, and at the present writing are 50 pfennigs. This figure, corresponding nominally to 12 cents, represents an enormous outlay to the Berliner, especially in view of his shorter average ride in comparison to New York.* The end is not yet because of the general rise in costs. Within the coming months we may expect to see fares of 60 pfennigs and later even of 80 or 100 pfennigs.

ANNUAL NUMBER OF RIDES PER INHABITANT, BERLIN

Year	Omnibus	Street Railway	City Steam Lines	Electric Rapid Transit	Total
1870	13	...	..	..	13
1875	15	16	..	..	31
1880	10	40	..	..	50
1890	18	74	13	..	105
1900	43	105	43	..	191
1910	70	150	53	16	289
1917	19*	264	48	33	364

* Withdrawal of gas-driven motor buses due to war conditions.—*EDITORS*

To judge from these initial experiences, the municipalities' experts were not in error in placing a low price on the property. The company had permitted it to run down in pre-war days by paying excessive dividends instead of putting more money into renewal funds. It is doubtful whether any other metropolis is burdened with a more out-of-date street railway. The twenty-year-old single-truck cars are in such condition that even on straight track they behave like bucking camels! On the large cars the trucks are out of square, hard riding and noisy. Most cars are still without vestibules. The method of fare collection is particularly annoying. As prepayment is not in vogue, the conductors are obliged to squeeze their way through cars that are so crowded that many a passenger rides free despite the requirement that each passenger must be able at any time to show a receipt for the fare paid. The ordinance calling for a 1 mark fine if the passenger has no receipt has proved neither just nor workable. Platform accidents and running by stops desired by passengers are numerous because the conductor is not on the platform when needed. Only a few cars have separate entrance and exit aisles, which are due to the influence of the American prepayment system.

The war intensified these evils. The fact that the street railway still shows heavier traffic from year to year is due largely to the small rapid transit mileage. The present route length of such lines in Berlin is now 23 miles (37.5 km.), with but 16 miles (20 km.) more under construction, which gives a total of only 39 miles (57.5 km.). The development of the Berlin transit system as a whole will be discussed by the writer in a later article.

*Mr. Zehme's statement that the average ride in Berlin is shorter than in New York requires explanation. The average ride in Berlin is probably shorter than the average ride in the Borough of Brooklyn, but is probably not shorter than the 1.25-mile average estimated by Stone & Webster late in 1919 for the Manhattan Borough lines of the New York Railways Company. The flat fare system prevails throughout the greater part of the Berlin surface railways, but owing to the absence of transfers many rides are longer than they would be under the American system of shortening the ride through transferring instead of through-routing.—EDITORS.

Safety Cars in Trenton

Report of Inspector for Public Utility Commission of New Jersey Answers Objections Raised by Complainants

THE Board of Public Utility Commissioners of the State of New Jersey has recently made public a report on safety cars particularly as operated in Trenton, made by H. C. Eddy, electric railway engineer, in response to a complaint by a local blacksmiths' union.

This local had adopted a set of resolutions to the effect that the safety car as operated in the city is a deadly menace to the lives and limbs of the people of this community, that too much responsibility is placed upon the operator, that the cars are frequently overcrowded, resulting in distraction to the operator, that the speed of the cars is too great and that the number of accidents caused by the operation of the cars is excessive. The Board of Public Utility Commissioners caused an investigation to be made and the results incorporated with the inspector's report.

The report cited the fact that for several years inspectors of the board have been studying the subject and have accumulated much data. On the basis of these, the general situation is summarized. Attention is directed to the generally increasing popularity of the safety car, at least among employees, and the board's inspectors find that whereas the general attitude of the public when the cars were first introduced was rather unfavorable the cars are increasingly popular as the patrons become accustomed to them and learn of the advantages which accrue from their use. The cars appear to be more popular in the smaller communities, but it is believed that with their more general use in larger cities most of the popular prejudice against them will be eliminated. Such prejudice as exists appears in part to be caused by a misconception of the use of the car and to a feeling that reversion to the single-truck type is a step backward.

The report points out that there are undoubtedly certain disadvantages in the operation of the one-man car, particularly overloading, resulting in the crowding of the front platform, which in turn is liable to result in physical interference with the motorman in the operation of the car. This matter had been taken up previously by the board in connection with the city of Trenton, where it had been recommended that the load be limited to fifty passengers. Attention was also directed to an order of the board, issued Nov. 27, 1918, prohibiting the occupancy by passengers of the platforms of the cars operated by the Trenton & Mercer County Traction Corporation.

The report also took up the difficulty of ingress and exit to the safety car, especially when the car is crowded. This was said to be due entirely to the use of one opening for both entrance and exit, and no reason is seen why this car cannot be constructed so as to provide a double opening, permitting passengers to board and alight at the same time. Counts made by the inspectors indicate that the average time of loading and unloading per passenger and the average time for passenger interchange is practically the same in Trenton for both one-man and two-man cars, except at one point where there is considerable congestion and where the one-man car interchange is slower. However, as the cars are designed to accelerate more rapidly than the ordinary two-man cars, time lost through delays can be readily made up.

As to the complaint that too much responsibility is placed upon the operator, the report points out that most of the extra duties are performed while the car is at rest. Provision is made in the design so that if he has to handle fares or transfers, or use his hands for any purpose whatever other than operating the car, the control of the car can be transferred to his foot. The fact is that the operation of the one-man safety car does not involve any duties other than such as are required of the operator of an auto bus, and the latter has the added duty of steering the vehicle.

As to the alleged excessive speed of safety cars in Trenton and the liability to accident, the report states that the speed limits prescribed by ordinance in the city are low, and that 12 to 15 m.p.h. would be reasonable. It is true, however, that the safety car sometimes exceeds this limit, which is objectionable. However, the accidents which occurred have not been due to the type of car and most have been of a minor nature. Many were not in any way due to the operation of the car.

The claim that the one-man car causes a reduction in the number of employees is true only to a small degree generally and is not true at all in the case of the local company. The adoption of this car has been largely for the purpose of furnishing more frequent service, which is possible as but one operator and only one-half the capital investment per car are required.

Co-operation from Public is Urged

The report suggests that the full co-operation of the traveling public would be a great aid in the successful operation of the safety car, particularly in such matters as passengers having exact change, rapid movement in boarding and alighting, moving toward the rear of the car when entering, etc.

In conclusion the report points out that there is no evidence to show that the one-man safety car should be withdrawn from service, but recommends:

1. That whenever and wherever the so-called "one-man car," whether equipped with automatic safety devices or not, is operated within the territory coming under the jurisdiction of the board, said car being of such design as that it is fitted generally with cross seats and has a seating capacity of from approximately thirty to thirty-four persons, the maximum number of adult persons who shall be carried in such car at one time shall not exceed fifty, and that notices be posted on the inside and outside of said cars to this effect.

2. That on and after July 15, 1920, in all cases where cars of the types referred to in (1) are operated, such cars shall be provided with a removable guard rail, so located as to prevent passengers from being crowded against the operator of the car and also to prevent the occupation by passengers of at least a portion of the front platform.

Norfolk & Western President Talks to Public

IN A STATEMENT which N. D. Maher, president Norfolk & Western Railway, made recently to the public a new note was sounded. The purpose of the statement was to show that the company was doing the best that it could with its facilities to meet the constantly growing demands of the section which it served.

To prove this such facts were given as gross earnings, equipment of cars and locomotives, engines and cars out of service and other facts on operation to show what has been done and what could have been done with improved facilities.

Illinois Association Holds Annual Meeting and Golf Tournament

Two Supply Men Read Good Papers on Getting Traffic and Car Inspection—Result of Ten-Cent Fare in Joliet and Publicity Discussed

A GOLF tournament, a fine luncheon, given by the Sangamo Electric Company, and two well-received papers, by W. McK. White and L. E. Gould, were the features of the one-day annual meeting of the Illinois Electric Railways Association at Springfield, July 30. Although the association had not held a meeting since July 16, 1919, the attendance was disappointingly small, only seven railways being represented by eight men. In the absence of President W. C. Sparks, general manager Rockford & Interurban Railway, who was prevented from attending the meeting due to a long illness from which he was reported to be recovering, the meeting was presided over by First Vice-President E. M. Walker, general manager Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.

In the report of the secretary-treasurer, R. V. Prather, the work of the year was briefly reviewed and the attention of the members called to the fact that public utility matters appear to be the main issue in the race for Governor. The propaganda being put out by certain of the candidates for Governor and other state offices and the action of the City Council of Chicago in sending out to all municipalities a resolution providing for the abolishment of the Public Utilities Commission, and requesting its adoption might, it was feared, cause a bad reaction against the utilities in the work of the new Legislature. In this connection members were urged to secure the co-operation of their local chambers of commerce, rotary clubs and other civic associations, and enlightened citizens generally, in counteracting the attack against state regulation in favor of home rule.

The secretary also made reference to the fact that the Illinois Gas Association had elected him secretary and had entered into the maintenance of a joint office with the Illinois Electric Light Association and the Illinois Electric Railways Association, the expenses of the office to be borne 75 per cent by the electric light association and 12½ per cent by each of the other associations.

Messrs. J. R. Blackhall, Joliet; Britton I. Budd and W. V. Griffin, Chicago, sent telegrams to the meeting expressing their regret that important matters made it impossible for them to attend. These men had been expected to take part in the program. A communication from Edwin C. Faber of Aurora directed the attention of the association to the meeting of the International Traffic Association, August 23 to 27, in San Francisco, at which it was expected that uniform traffic laws for use in the United States and Canada would be drafted. Mr. Faber's letter suggested that the electric railways should make some move to be properly represented at this meeting. D. E. Parsons, general manager, East St. Louis & Suburban Railway, remarked that he expected to be on the Coast at that time and intended to be present at the meeting, and that he would be glad to take care of any matters which any railway company might care to bring up before that meeting. No action was taken toward appointing an official representative.

The paper by Mr. White, which appeared in last week's issue practically in full, was then read and was discussed briefly by John Benham and Mr. Walker, who indorsed most of the points made in the paper. This was followed by Mr. Gould's paper, which appears elsewhere in this issue.

Result of 10-Cent Fare in Joliet, Ill.

In the absence of Mr. Blackhall, who had expected to read a paper on the results of the installation of a 10-cent fare in Joliet, W. H. Heun, superintendent of transportation, Chicago & Joliet Electric Railway, presented some statistical matter from a letter prepared by Mr. Blackhall to show the results which had obtained.

Approval of the Public Utilities Commission to increase fares from 5 to 7 cents, effective Aug. 7, 1918, was the first move accomplished in the effort of the company to improve its revenue situation. Owing to the influenza epidemic that prevailed that year, reaching its height in October, it was impossible to determine just what effect this increased rate of fare had on traffic. The rate was further increased to 10 cents, effective Aug. 12, 1919. From that date to Dec. 31, 1919, the traffic showed a decrease of 1.4 per cent as compared with the same period in 1918, under a 7-cent fare.

Taking the first six months of 1920, under a 10-cent fare, and comparing this with the results obtained for the first six months of 1919, under a 7-cent fare, and the first six months of 1918, under a 5-cent fare, it was thought that a fair comparison of the results obtained could be made. The following table was presented to show the results during these three periods:

REVENUE PASSENGERS CARRIED

During six months ended	
June 30, 1918, with 5-cent fare	2,960,691
June 30, 1919, with 7-cent fare	2,485,633
June 30, 1920, with 10-cent fare	2,574,901

1919 over 1918, with 40 per cent increase in fare, there was a 16 per cent decrease in traffic.
1920 over 1919, with 42.7 per cent increase in fare, there was 3.6 per cent increase in traffic.
1920 over 1918, with 100 per cent increase in fare, there was 13 per cent decrease in traffic.

REVENUE FROM PASSENGERS

First six months of 1918, with 5-cent fare	$146,961
First six months of 1919, with 7-cent fare	174,005
First six months of 1920, with 10-cent fare	248,442

1919 over 1918, with 40 per cent increase in fare, there was an 18.4 per cent increase in revenue.
1920 over 1919, with 42.7 per cent increase in fare, there was 42.8 per cent increase in revenue.
1920 over 1918, with 100 per cent increase in fare, there was 69.2 per cent increase in revenue.

Mr. Blackhall's letter pointed out that it is reasonable to believe that if the fares had remained at 5 cents there would have been a natural increase in traffic and revenue in 1920 over 1918 of at least 12 per cent, so that the increase in revenue shown during that period cannot be entirely credited to increased fares. He thought it was safe to say, however, that 100 per cent increase in the rate of fare had resulted in increasing

the revenue 50 per cent. On city lines 11 per cent more passengers were carried in June, 1920, than in June, 1919.

The additional revenue derived from increased fares, however, has been practically all used to pay increases in wages granted after the fares were increased. In each instance the increase in wages became effective two months before the increase in fare as approved by the commission became effective.

Asked about the attitude of the public toward the 10-cent fare, Mr. Heun said that there had been very little complaint about it; in fact, there had not been as much opposition to this rate of fare as there had been when the company asked for a 7-cent fare. It was also pointed out that the 10-cent fare has not developed any jitney competition. At one time, when the fare was still 5 cents, jitneys began to operate, but after a period of three months, when the city forced them to take out bonds they suspended operations.

Not by way of comparison, but simply to show how different conditions may be in different cities, Mr. Walker said that in Terre Haute for the twelve months of 1918 the total receipts had been $390,000, while for the first six months only of 1920 the receipts had been $335,000, the fare being 5 cents in both cases. The car-miles operated now as compared with last year have been increased 60 per cent, while the revenue has increased 65 per cent. The two cities were parallel only in that in both Terre Haute and Joliet the total revenue had about doubled this year as compared to last. Speaking of jitney competition Mr. Walker remarked that if the haul was short and the pavement good anything above a 5-cent fare was an invitation to jitney buses to begin business.

Publicity Situation Reviewed

B. J. Mullaney, who has been very active in the work of the Illinois Committee on Public Utility Information and the spread of this idea to other states, was then called upon. He said that committees had now been organized and were functioning in Indiana, Kentucky and Nebraska as well as Illinois, that organizations in Ohio, Iowa, Wisconsin and Missouri were getting started, while in Michigan and Texas plans were under way for completing an organization of a similar publicity committee. He said he also felt confident that co-operation on the part of the main national associations might be expected before long.

Mr. Mullaney urged the electric railway men to greater activity in putting before the public the simple and obvious facts of the utility business. He said that if all of the men of the industry would simply keep passing along the simple truths to all with whom they come in contact in the course of time this could not help but have a very beneficial result in securing an understanding on the part of the general public as to the true light in which they should look upon the public utility servants. The speaker said he regretted to say that the railway men were not yet doing as much as they should in this matter of proper publicity. He commented that many were not doing any advertising in their local papers, and it was his opinion that every company should be a fairly frequent space user in the local papers. He said that if we in the utility business do not look after our own interests in the perfectly legitimate way which is at our command there is no one else who is going to do this for us, and it will be our own responsibility if the public is not in due time made to understand that the welfare of the utilities is their own welfare.

Directing his talk to the supply men present, Mr. Mullaney said that they were vitally concerned in the welfare of the electric railway industry and should take it upon themselves to seize every opportunity to spread the proper knowledge of the industry to the general public. He pointed out the selfish interest of the manufacturers and supply men in the well being of the utilities, saying that the utility companies could now, for the most part, operate their properties as they are, on present rates, and "get by" so far as earnings are concerned. The real trouble which they face is the necessity to expand facilities and their inability to get the necessary money to make such extensions. Making extensions calls for the equipment of the manufacturers, and that is why they should take a keen interest in helping the utility companies to bring about a proper understanding of their problems on the part of the public so that popular sentiment will not react against the ability of the company to get new money for extensions. He said the supply men could help not only by direct activities in contact with the people but also by making suggestions to the railway men and the publicity committees as to ways and means of solving the problems.

Mr. Parsons stated that he had found that about the only way he could get the local papers to use the matter sent out by the Illinois committee was to make some comment upon that information, tying it up with the local situations. In fact, he said that the newspapers had flatly refused to publish the matter unless it did have a local aspect. In this connection he asked Mr. Mullaney if it would not be possible for the committee to send the information it expected to put in the hands of the newspapers to the local managers long enough in advance to give the operating man a chance to add some expression which would tie the general situation up with the local situation, so that the matter could go to the newspapers accompanied by this local interpretation. Mr. Mullaney said that this might be possible in a few cases, but that many times it would involve a delay which would make the news too old. It was pointed out that this local handling of the general information by the local managers was the manner of presentation that the committee was trying particularly to obtain.

Nic LeGrand, National Safety Car & Equipment Company, St. Louis, Mo., was called upon and he spoke briefly of the high prices which now obtain for safety cars and the present reluctance of the bankers to arrange long term car trust equipment notes providing for deferred payment. He said that two years was about the longest term the bankers would now make and that they wanted a rate of 8 per cent. He considered these conditions practically prohibitive. In explaining the slow delivery of safety cars he said that the car builders had been very seriously interrupted by the strikes in their plants, but that conditions were now much improved.

The nominating committee, of which Mr. Parsons was chairman and R. A. Moore, Joliet, and John Benham were the other members, recommended the election of the following officers for the ensuing year, and the convention approved, instructing the secretary to cast the unanimous ballot of the association.

President, E. M. Walker, general manager Terre

Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.; first vice-president, W. L. Arnold, managing director Elgin & Belvidere Electric Company, Chicago; second vice-president, A. D. Mackie, general manager Springfield Consolidated Railways; secretary-treasurer, R. V. Prather, Springfield, Ill.

Entertainment Features of Convention

At the close of the meeting at noontime, the Sangamo Electric Company, in whose assembly room the meeting had been held, entertained the members and guests at a luncheon, which was so enjoyable and so elaborate that there were many remarks during the afternoon indicating that this was responsible for many of the low scores turned in in the golf tournament. After the luncheon the delegates made a brief inspection trip through the plant of the Sangamo company and saw the manner of making and testing meters from the beginning to the finished product.

In the afternoon, at the Springfield Country Club, a handicap match tournament against par for the president's cup was won by Robert E. Belknap, Bethlehem Steel Company, who with a handicap of 21 made a gross score of 86.

Basing Car Inspection on Energy Consumption*

Advantages of This System Over Mileage or Time Basis Pointed Out — This System Is Flexible, Accurate and Controls Length of Inspection Period According to the Work Done

By L. E. GOULD
President Economy Electric Devices Company, Chicago, Ill.

PROMPT and regular inspection of electric railway rolling stock is of great importance, not only from the standpoints of safety and good operation but also because forehandedness in inspection results in lower over-all car maintenance costs, while deferred maintenance means mounting costs for repairs.

Most car inspection work now is based on mileage or a combination of mileage and time. With either of these a system of clerical records is required for calling in the cars for inspection. Extensive clerical work is necessarily expensive, particularly so when the keeping of mileage in the mechanical department duplicates similar work in the transportation or auditing department. The expense for accurate mileage keeping has deterred numerous roads from inspecting on the mileage basis, and therefore the time basis is being used, even though the time unit is generally recognized by engineers to be a much less accurate and less efficient unit.

The most accurate unit to use in determining when cars should be called in for inspection is one which will most nearly measure the punishment which the car has received. This unit should fill every situation developed in revenue as well as non-revenue service. And the unit should be one which will admit of applying a uniform factor of safety rather than one which does not take into account the actual work which the car has done. It should be a unit of punishment.

Consider first the time unit. It does not in any but a very approximate way take into account the distance a car is operated between inspections. Neither does it account for the kind of service treatment the car has received. Likewise, the mileage unit, of say, 1,000 miles, will call in a car for inspection only on the distance basis, irrespective of whether that car has been well or poorly operated; whether it has been in a fast or slow schedule; with or without a trailer, with or without heavy loads or on hilly or level track.

We believe the energy consumed is the most desirable inspection unit. Kilowatt-hour consumption between inspections is the safest, most accurate, most efficient and most readily available measure of work done by the essential parts that wear and need inspecting. It is the most accurate basis for measuring the car inspection interval, because most parts of the car require attention in direct proportion to the work done by the car motors.

Electrical equipment depreciates and wears in direct proportion to the energy consumed by the motors. The wear of truck parts, brakeshoes and wheels depends upon speed, number of stops per mile, condition of track, weight of car, etc., all of which are factors in determining the rate of energy consumption. If for any reason, such as faulty connections, open armature coils, short fields, binding brakes, tight side or center bearings, etc., a car is working unsatisfacorily, more energy will be consumed for a given mileage of the car than if the equipment were in good condition and the car will automatically be called in early for inspection.

If a car is on an easy-schedule line, having infrequent stops and level track, it will consume less energy than a car operating on a difficult schedule with frequent stops and severe grades. On a mileage or time basis each car would receive an equal number of inspections. On a kilowatt-hour basis fewer inspections would be given the car operating on the easy schedule, and thus a substantial saving in labor would be effected.

If the equipment is unsuited for the service to which it is assigned it will consume more energy and be punished more than the proper equipment for this service, and hence, on the kilowatt-hour inspection basis, will come in oftener for inspection. A car with tight brakes, nosing trucks, short-circuited fields or when roughly or improperly handled by the motormen will consume more energy and will need inspection more frequently. Inspection on the kilowatt-hour basis automatically shortens the inspection period on the roughly handled car and prolongs the period on the properly handled car.

Work done by a car operated by barnmen or in switching around the yards is not accounted for on a time or mileage basis. The kilowatt-hour basis measures every bit of work done by a car, no matter who operates it.

When a car is hauling a trailer it is required to do more work than when operated alone, but under the

*Abstract of paper presented at meeting of Illinois Electric Railways Association, Springfield, Ill., July 30, 1920.

mileage or time basis of inspection this additional work is not taken into account, while on a kilowatt-hour basis this additional work is automatically taken care of. In brief, car inspection on the kilowatt-hour basis brings a car in for attention in direct proportion to the punishment that that car has received.

Development of Inspection System Based on Energy Consumption

The idea of car inspection on the work done or kilowatt-hour basis was first conceived as an alternative method of inspection on a large Eastern property which was at that time inspecting its equipment upon a time basis. The management of this property recognized that the time basis of inspection was unsatisfacory and the officials were desirous of changing to the mileage basis, but the local conditions made it almost impossible to obtain the car-mileage within a reasonable period of time. Hence there were many chances for missing inspections or for cars exceeding the mileage allowance between inspections. At about this time Economy power-saving watt-hour meters were being installed on this property and one of our engineers advanced the idea that the kilowatt-hours consumed could be used as a close measure of the car mileages. The proper inspection unit could be determined by finding, for each class of equipment, the average total kilowatt-hours consumed in running the desired mileage between inspections.

One of the first objections raised in this connection was that under some operating conditions a car might consume more energy than under other conditions and hence would come in for inspection more frequently than would happen under the mileage system As the general plan was developed, however, it was found that this seeming objection to the kilowatt-hour basis of inspection was one of the strongest points in favor of it, since it provided that the car would be inspected on a basis of the actual work it was required to do rather than upon the mileage covered.

In addition to these fundamental advantages there are also the following features in favor of this method of handling inspection intervals as developed for use with the Economy power-saving railway meter equipped with car inspection dials. (1) The meter automatically indicates without any clerical labor when a car is due for inspection; (2) the inspection periods are instantly indicated, no time being required to figure the mileage made, which, under the very best conditions, means a delay of a day; (3) the meter shows at a glance how much more work a car can do before inspection; (4) in case of a road failure the meter indicates how much work the car has done previous to the failure; (5) an inspection dial set-back feature assures that the foreman checks the inspection as having been made.

The kilowatt-hour basis of inspection is very flexible and the length of the inspection period may be changed to suit conditions. If it is found that the inspections are too frequent one need merely increase the kilowatt-hour interval to a point which will give the desired increase in the amount of work which a car will do between inspections. Experience on roads which are using this system shows that very substantial savings can be accomplished by this method.

Economies that Have Been Effected

On a route on one property where this method of calling in cars for inspection has been used for nearly two years we have twenty-one cars operating out of a certain barn. Practically all of these cars are operated during the rush hours, while only five cars are operated during the non-rush period. Under the old method of inspection on a time basis these cars were inspected every four days. This required about 150 inspections per month. On the kilowatt-hour basis of inspection the average inspection period is a little more than twenty days, or a total of thirty-two inspections per month, as contrasted with 150 formerly, and the factor of safety has not been decreased. The average time necessary to make an inspection is said to be about two hours. Therefore, the adoption of the kilowatt-hour basis shows a total saving in time of 236 hours per month, or about ten hours per car per month. This saving in time may be absorbed either in more thorough inspection or by a reduction of the inspection force.

Another large road estimates that the reduction in maintenance labor, due to the decrease of the number of inspections by the use of the kilowatt-hour basis of inspection, will be about $30 per car per year. While this figure is not so high as that previously quoted, in the latter case it represents a reduction from the cost of inspection on a mileage basis as against a reduction from a time basis of inspection in the first instance, and experience is showing a reduction in road failures on the cars so far equipped for kilowatt-hour inspection.

Summing up these points in favor of this method of inspection, we have the following: It gives more uniform intervals of inspection based upon the actual work done by the car; it is flexible and allows a change of inspection interval when needed; it cuts down shop expense by eliminating unnecessary inspections; it indicates the inspection interval instantly and automatically, and in addition shows the shop men how much more work a car may do before inspection so that they map assign the car to the proper run which will bring it back to the barn at the time it will be due for inspection.

Construction of Meter for Handling Inspection Work

In order to handle the kilowatt-hour inspection plan with Economy watt-hour meters a new meter train was designed and is now in production. Separate dials were added so that the indication of inspection intervals is automatic and in no way confused with the dial regularly read by the motorman when entering his power-saving records.

In the standard construction as now being made by the Sangamo Electric Company for a substantial number of roads the inspection dial has three circles placed at the bottom of the dial face. These are marked respectively A, B and C, and each has a successively higher value in kilowatt-hours per revolution. For example, the dials for safety cars are: A = 1,000, B = 7,500 and C = 30,000 kw.-hr.

Each dial is equipped with a red marker hand, which may be set at any desired inspection interval value, and a meter-driven hand can be set back to zero when the inspection is made. This reset hand is controlled by a key, so that it is impossible for any unauthorized person to change the setting when the key is withdrawn from the lock.

The red marker hand on dial A is set so as to indicate a value of kilowatt-hours equivalent to the usual inspection period for brakes and controllers. This is usually about one day's work, an average of 90 to 100 miles for city service and 100 to 200 miles for interurban

service. When the black meter-driven hand reaches the marker hand the shopmen know that the car is due for inspection of brakes and controllers. Likewise the marker on dial B is set to indicate the proper inspection interval for oiling and dial C is set to indicate the proper inspection interval for general inspection. The values given for a complete rotation of each dial are made so as to allow a great deal of variation in the settings of these marker hands, thus allowing local conditions to be taken properly into consideration.

Three sets of gear ratios for inspection dials are manufactured, one for light-weight city cars, one for double-truck city cars and one for interurban cars. These, together with the wide range of settings of the marker hand on any one dial, make a very flexible and easily adjusted medium for the proper indication of inspection intervals.

Selling the Zone Fare Idea in San Diego

Carefully Planned Educational Methods Overcame Adverse Public Opinion—Girls Sell $5,000 Worth of Tickets in Advance

DURING the annual meeting of the California Electric Railway Association held at the Palace Hotel, San Francisco, May 25, 1920, William Clayton, vice-president San Diego Electric Railway, declared the new zone system of fares which went into effect in San Diego Jan. 1, 1920, by order of the California Railroad Commission, to be a complete success.

During the first four months to April 30, 1920, the revenue passengers decreased 164,196, or 2.06 per cent, as compared with the corresponding period during 1919, while the revenue received from the transportation of passengers increased $93,662, or 28.40 per cent. The company's income shows an increase of $91,036, or 25.35 per cent, and the outgo an increase of $34,880, or 7.20 per cent. As a result, the net increase for the first four months amounted to $56,155, or 44.87 per cent.

Mr. Clayton expressed the opinion that the zone system of fares was the best method of increasing the company's income, for the reason that under conditions existing in San Diego it is the best and most economic plan for the public and the company. At first the public did not believe this. In fact, with the exception of the Mayor, the entire official family of the city was opposed to the zone system, and in entire agreement with them were the real estate men, the Merchants' Association and the Chamber of Commerce. However, an educational campaign of such comprehensive scope was carried out that not only were a large number of tickets sold in advance, but in many other ways the riding public was so well prepared for the change from straight fare to zone system that there was no confusion or congestion when the new plan went into effect. Moreover, the public had been won over from opposition to approval so effectively that receipts since the change, as noted below, are highly satisfactory.

The educational work began with the company's own men first, and all transportation department employees attended one-hour classes (on company time) until they had been thoroughly grounded in the principles involved. These classes were addressed by E. J. Burns, assistant to the vice-president, the manager of transportation or the traffic man.

As it was believed that success could be attained only through personal contact with the public, it was deemed necessary to supplement the work which the company's own employees could do by extra help. Accordingly, twenty intelligent girls were selected and given a ten-day course of training. In this time they were coached not only on the matters involved in the zone system but also on the financial affairs of the company. The company made arrangements so that these girls were provided with tables where they would meet the public in banks, department stores and hotels. The tables were provided with placards and literature and the girls were to answer questions about the new zone system and to sell street car tickets. To encourage competition, prizes were offered the girls who sold the greatest number of tickets. The contest extended over ten days, just prior to Christmas, and the girls were provided with books of tickets containing coupons for forty rides, good until used. The books were neatly made up in Christmas covers and sold for $3. In this ten-day period this team of twenty girls sold about five thousand dollars' worth of tickets.

The fundamentals of the zone plan were explained to the heads of large industries, wholesale houses and department stores, and through their co-operation the street railway company employees were enabled to address the workers in these stores and industries. For example, the traffic man talked to a meeting of employees at every large mercantile or industrial establishment, explaining what the zone system was, how it would work and answering questions or objections that were raised. In each of these talks the traffic man was accompanied by platform men in uniform who sold books of tickets. Arrangements were ordinarily made with the employers beforehand so that any employee could get a book of tickets by signing a receipt, to be turned over to the company, which authorized a payroll deduction. It is notable that employers were willing to have employees attend these meetings during working hours even in the rush season just before the Christmas holidays. One of the most important features of the plan for "selling the idea" was to give platform men 3 per cent of ticket sales. Under the plan 3 per cent of all money received from the sale of 7½-cent tickets each month is set aside as a bonus for platform men and is added to their wages on the basis of the number of hours worked. The total number of platform man-hours is made equal to this 3 per cent fund and the number of hours each man has worked determines his share of the total.

Under this plan the conductors and motormen are always anxious to sell tickets, and in the several months' experience with the plan it is found that more than 95 per cent of all 7½-cent tickets sold are purchased on the cars. Under this plan the platform men are charged with so many books of tickets when they receive them, and accounting is simplified because each man is responsible for his supply.

Arrangements were made with the telephone company so that on New Year's Eve and New Year's Day every telephone subscriber was called up and reminded that the zone plan was going into effect. The usual conversation was "Happy New Year! This is the San Diego Electric Railway. Just to remind you that the zone system goes into effect Jan. 1." This telephoning was done from the four branch stations of the telephone company, in each of which special switchboards had been fitted up for the purpose. The railway company

kept men on duty in each of these stations to answer inquiries which might call for more information than the girls could give.

Several days prior to the adoption of the new system cars carrying signs were sent over all lines of the system. A real test of public sentiment was made on Christmas Day, when 10,000 people had gathered in the stadium to witness a football game. For this occasion the company had one of its line wagons fitted up with signs bearing announcement of and statements about the zone system. This wagon made the circuit of the stadium between the two halves of the football game. Observers stationed throughout the crowd did not hear any adverse comments. In fact, platform men in uniform, who handed out pocket size maps showing the limit of the zones, as the crowd was leaving the grounds, sold some three hundred dollars' worth of tickets.

So many tickets had been sold and the details of how the plan would work were so thoroughly explained in advance that there was no confusion or congestion on Jan. 1. During the first week instructors were detailed to ride the cars and answer questions or aid the conductors in their work. A few days before the end of each month this plan is repeated.

Under the plan as used in San Diego tickets are not put in a fare box. The fare register rings up 5-cent fares on one side and tickets and transfers on the other. Ten-cent fares are registered by a portable neck register which the conductor carries. The company supplies a special vest equipped with pockets for tickets and transfers, which has been found to be most convenient for speedy service to the passenger. Under the San Diego plan there is only one collection per passenger on each trip, and identification slips, issued when fare is paid, are taken up when zone boundary is crossed. Transfers are issued in three colors, this being sufficient to identify the ride to which the passenger is entitled under the several combinations that are possible. Under this plan all looping is prevented.

Owing to the decrease in the number of men stationed at Camp Kearney, North Island and other military points in the vicinity of San Diego it was expected that year. As shown by the accompanying table, however, there has been only a 2 per cent decrease in the business in these months, and in the months of April there was a 1 per cent increase. In May this rose to 5 per cent. It is notable that the table shows a 29.50 per cent gross increase, which is the equivalent of a 6½-cent fare. This indicates, company officials believe, that there has been no shrinkage on account of the increased fare, and all of the short-haul business has been retained, which would not have been the case had an increased fare for the entire system been adopted. Moreover, the company has the great advantage that in the event that some later change may be necessary this can be accomplished by rearranging the zone limit much more easily than would be possible if it were necessary to change the amount of fare.

SAN DIEGO ELECTRIC RAILWAY COMPANY

Comparative Statement of Income and Outgo and Operating Statistics for the first four months, January-April, 1920, Compared with the corresponding period of 1919

Item	First Four Months January–April, 1920 Amount	Per Cent	First Four Months January-April, 1919 Amount	Per Cent	Increase or Decrease Amount	Per Cent
Income:						
Revenue from cash-fare passengers	$152,771.65	33.93	$287,738.53	80.12	$134,966.88	46.91
Revenue from ticket passengers	270,667.39	60.13	42,038.31	11.71	228,629.08	543.85
Revenue from transportation of passengers	423,439.04	94.06	329,776.84	91.83	93,662.20	28 40
Other revenue from transportation	358.00	0.08	1,016.02	0.28	658.02	64 76
Revenue from other railway operation	22,348.82	4.97	25,316.47	7.05	2,967.65	11 72
Non-operating income	4,017.95	0.89	3,018.44	0.84	999.51	33 10
Total income	$450,163.81	100.00	$359,127.77	100.00	$91,036.04	25 35
Outgo:						
Way and structures	$24,551.36	5.45	$25,765.95	7.17	$1,214.59	4 71
Equipment	22,059.39	4.90	21,289.24	5.93	770.15	3 62
Power	64,583.07	14.35	55,508.13	15.46	9,074.94	16 35
Conducting transportation	138,964.12	30.86	120,263.59	33.49	18,700.53	15 55
Traffic	7,462.65	1.66	3,448.19	0.96	4,014.46	116.39
General and miscellaneous	47,974.90	10.66	50,591.08	14.09	2,616.18	5.17
Transportation for investment—Cr	186.19	0.04	24.09	0.01	162.12	673.54
Operating expenses	$305,409.30	67.84	$276,842.11	77.09	$28,567.19	10.32
Depreciation	91,306.84	20.28	103,547.06	28.83	12,240.22	11 82
Taxes	28,540.84	6.34	23,255.82	6.48	5,285.02	22.73
Rent of Point Loma Railroad	7,453.37	1.66	.....	.....	7,453.37	.....
Interest on funded debt	62,066.67	13.79	62,733.33	17.47	666.66	1.06
Amortization of discount on funded debt	4,774.20	1.06	4,825.56	1.34	51.36	1 06
Sinking fund (retirement of bonds)	19,600.00	4.35	13,066.64	3.64	6,533.36	49 99
Total outgo	$519,151.22	115.32	$484,270.52	134.85	$34,880.70	7 20
Deficit	68,987.41	15.32	125,142.75	34.85	56,155.34	44 87
Operating statistics:						
Revenue passengers carried:						
Cash fare passengers	2,785,171	35.64	5,738,171	71.92	2,953,000	51 46
Revenue ticket passengers	3,873,862	49.57	1,147,663	14.38	2,726,199	237.54
Transfer passengers	1,155,201	14.79	1,092,596	13.70	62,605	5.72
Total revenue passengers	7,814,234	100.00	7,978,430	100.00	164,196	2.06
Car-miles and car-hours:						
Car-miles operated	1,258,619	.....	1,170,229	.....	88,390	7 55
Car-hours operated	132,117	.....	129,631	.....	2,486	1.92
Car-miles per car-hour	9.53	.....	9.03	.....	50	.....
Platform hours and wages:						
Platform hours	235,730	.....	234,034	.....	1,696	0.72
Platform wages	$105,822.04	.....	$97,925.50	.....	$7,896.54	8 06
Average cost per platform hour	44.89c.	.....	41 84c.	.....	3.05	7 28
Average cost per car-mile	8.41c.	.....	8.37c.	.....	0.04	0.48
Passenger revenue statistics:						
Average revenue per cash fare and ticket	6.76c.	.....	5.22c.	.....	1.54	29 50
Average revenue per revenue passenger	5.76c.	.....	4.50c.	.....	1.26	28 00
Average revenue per car-mile	35.76c.	.....	30.69c.	.....	5.09	16 58
Average revenue per car-hour	3.41c.	.....	2.77c.	.....	0.64	23 10
Average income per day	$3,720.36	100.00	$2,992.73	100.00	$727.63	24 31
Average outgo per day	4,290.51	115.32	4,035.59	134.85	254.92	6.32
Average deficit per day	$570.15	15.32	$1,042.86	34.85	$472.71	45 33

London's Traffic Problem[1]

Comparison Given of Means of Transport in London and Other Cities on Basis of Carrying Capacities and Weights per Seat—As Auxiliary to Rapid Transit Lines Bus Has Many Advantages—All Transportation Means Should Be Co-ordinated with Unity of Financial Interest

BY LORD ASHFIELD
Chairman and Managing Director London Electric Railway and Associated Companies

RAILWAYS, tramways, motor routes are alike in purpose, though different in form. The tendency is to judge them by their form and to insist on their diversity, forgetting almost wholly their essential likeness as carriers of passengers. If it is considered that a railway, or railroad, as it may be better named, is but a special type of street, one common aspect of the three is more quickly recognized and one common problem of the three more easily solved.

There is a street and in it passengers requiring to be carried along its way. At first the passengers are few and a motor omnibus serves, then the passengers increase in numbers and more and more motor omnibuses are added, until there comes a time when the street is full of vehicles. For, after all, the motor omnibuses are only a part of the whole vehicular traffic. The street must be widened to relieve the congestion, and the question that should present itself is whether a new and special street should not be built to take off one class of the traffic; it may be heavy goods, but it is much more likely to be passengers. This special street may be underground, as in London, or elevated, as in New York, but it is only a special street, where greater speed is possible and fewer interruptions from cross and converging traffic are experienced.

What is the position of a tramway? It is intermediate between a motor route and a railway. It enjoys severally the virtues of both, but it accumulates their defects. It can deal with the casual passenger of the street almost as well as a motor route. It can deal with a heavy occasional load of passengers almost as well as a railway. But it needs a costly special track with its equipment like a railway, and that special track is subject to all the hazards and delays of the street, which means no advance in locomotion over the motor route. Is it cheaper to widen a road to build a tramway or to build, above or below, a special railroad? The answer turns not merely upon the capital expenditure, though that may be decisive; it turns also upon the public advantage.

In America there are practically no motor routes. The motor omnibus (except for the Fifth Avenue Coach Company of New York, which has a special sphere of influence there and works about 300 motor omnibuses) is a new thing and its development is only just beginning. There have been street railways for many years, not stereotyped like the tramways of England, but always progressing in design and construction and in methods of operation. The street railway, as an intermediate type capable of dealing with long- and short-distance passengers, with heavy and light loads of passengers, has so far met the needs of the expanding cities in America efficiently and well. It fulfills its function. But there comes a time when the expansion is too great even for the most efficient street railway to meet the public demand for travel. It is generally recogized that when the population tends to reach the second million the time has come to resort to some other instrument of travel.

RADIAL ROUTES BECOME OVERLOADED

Two causes lead up to this conclusion. First, the city has spread out over a territory extending some 8 miles or more on every side from the center. The time taken on the journey between the center and the fringe of the built-up districts, under ordinary street conditions, is prolonged to fifty minutes or more, which is felt to be too extravagant a consumption of the working day. Second, out there the size of the city is the index to the magnitude of its business, and this business has filled the main radial routes with a great volume of vehicular traffic, to be in itself a hindrance to speedy movement, and has created a density of passengers at certain busy hours on those radial routes with which a street railway, still less a motor route, cannot satisfactorily cope. The task of decentralizing a city is one not to be lightly undertaken, and unless this can be achieved another remedy must be found. What is needed is grasped at once in America. It is a special street above or below the existing surface street upon which the passenger traffic can be carried conveniently and quickly. The obstacle in resorting to this remedy is the capital invested in street railways. There is rarely enough passenger traffic on a radial route to support both an expensive elevated or underground railway and an expensive street railway or tramway. American cities are one by one being compelled to face the loss which such a conjunction involves. It is this obstacle which is now slowly directing attention to the motor omnibus.

The motor omnibus is just what is required to supplement and feed a railway. It has no fixed capital in track and equipment. It is not tied to a route. It can follow the passenger traffic to its source or it can lead the way to new settlements. It can take up the casual short-distance passenger and by a complex ramification of routes, each independently worked, meet his closest requirements. All the while the main volume of

[1][Lord Ashfield, formerly Sir Albert Stanley, has contributed an extended article on "London Traffic Problems" to the May issue of the *Nineteenth Century and After*. In this article he discusses the present transportation systems in London, in which the rapid transit lines and buses, with certain outlying trolley lines, are owned by private interests, while the tramways serving a large part of the central part of Greater London are owned by the London County Council. Lord Ashfield urges in his conclusions, among other things, the "transfer of all transportation agencies to private enterprise, subject to public control, and the establishment of a pooling scheme under which measure of co-ordination may be taken without prejudice to any specific interests." Outside of the purely local situation considered, Lord Ashfield's article contains much that is of general interest and application. The accompanying article is an abstract of that part of his contribution in the *Nineteeth Century and After*.—EDITORS.]

passengers can be carried swiftly in the leading directions by the special railroad system without occupation of the street capacity. Once a city passes a certain size the street railway solution of the traffic problem is seen not to have been the right one. The street railway is an intermediate solution, good until a more highly specialized scheme of transport facilities is wanted.

Speed Governs Distance Served

More important than the capacity of the transport facilities, for mere multiplication of services will meet this, is the speed. The citizen of New York has made a fetish of speed. He gives himself pains to catch up a few minutes. He chooses instinctively not the most comfortable conveyance but the fastest. Thus he crowds the subway to distraction. Now that London is outgrowing the distance that can be covered by the ordinary stopping train it must learn the same lesson and by taking thought for the future it must avoid the misfortune that befalls the New York passenger.

What time will a regular passenger give for his journeying day by day between his home and his workplace? Not much more than 45 to 50 minutes, of which only 30 to 35 will be available for the actual journey by train, tram or omnibus, the higher allowance occuring where the time taken to reach the transport agency is less, as with the train or omnibus, on account of their more frequent stops. Given a practical time limit, such as this, the speed governs the distance that can be served.

The present average speed of the underground railways is about 18 miles per hour. By the present nonstop working this speed is raised to about 25 miles per hour. This corresponds closely with the average speeds reached on those portions of the main-line railways now electrified where the stops to be made are infrequent. The number of stops is the real factor governing the speed. The average distance between stations on the underground railways is about half a mile, on the main-line railways more than a mile. The demand for frequent stops on a railway is short-sighted, and the tendency for the future must be to space out the distance between stations on urban railways, leaving to the tram or omnibus the task of the more detailed distribution of the passengers and the carriage of those traveling comparatively short distances. It will then be possible, with the aid of improved equipment, to raise the average speed of a suburban railway service to 30 miles per hour and so cover the circle of 15 miles radius of the center in thirty minutes, which is, as nearly as may be, the problem to be solved.

Turning to street transport agencies, the omnibus is more speedy than the tram for several reasons. Trams running on a fixed track must observe a fixed order or sequence, and the slowest tram of a series determines the speed of all. Tram stops are longer than those of the omnibus, and at the same time more frequent, in consequence probably of the larger seating capacity of the tram. Trams are also more liable to delays. Whatever the causes, the result is that the average speed of trams in London is about 9 miles per hour and of omnibuses about 10.5 miles per hour.[2] The distances which they can cover in the allotted journey time are therefore 5 and 6 miles respectively. This affords the most conclusive argument against either of these agencies taking a place as the mainstay of passenger movement in a Greater London. Both must be auxiliary to railways, and as an auxiliary the omnibus has great advantages. Looking to American experience once again the best record for speed on a street railway system is 11 miles per hour, and this is only secured by careful and efficient operation and a scientific study of stopping places. It is exceptional.

Capacity a Function of Headway

Although the factor of speed is emphasized, it is not to the neglect of the factor of capacity. The real criterion of capacity is the number of seats in a traffic unit—a train, a tram with its trailer, a motor omnibus. When the underground railways were built the designers made inadequate provision for trains of the length which now seem to be requisite. The earliest tube, the City & South London Railway, has platforms capable only of accommodating a train of five small cars seating thirty-six passengers each. This railway is in urgent need of modernization and enlargement. The Central London Railway has platforms capable of accommodating seven cars of the present standard size seating forty-eight passengers each. The Baker Street & Waterloo section, the earliest portion of the London Electric Railway, has platforms to accommodate five standard cars, but the later sections of this railway have longer platforms for six cars. Working the platforms to their fullest limits and making such alterations as are feasible a standard of seven cars to a train, giving seats to 336 passengers, is the best prospect. Compare with this the present practice of New York, where ten-car trains, each car seating ninety passengers, are run.

Turning to street passenger vehicles, the standard tramcar of the London County Council seats seventy-eight passengers and when coupled with a trailer 132 passengers. The present motor omnibus seats thirty-four, and the new omnibus, under construction for the replacement of the present fleet, forty-six. This must not be regarded as the limit to the seating capacity of a motor omnibus. In Chicago there is already a motor omnibus seating fifty-four, and designs have been prepared and an experimental vehicle is being built in this country to seat fifty-six. In this connection it is important to consider weight. The tramcar seating seventy-eight passengers weighs 15 tons, or represents a dead weight per passenger of 400 lb. The present omnibus seating thirty-four weighs 7,300 lb., or represents a dead weight per passenger of just over 200 lb. The new omnibus seating forty-six weighs 4 tons, or represents a dead weight per passenger of 175 lb., while the still larger omnibus to seat fifty-six will weigh, it is expected, 8,500 lb., and this represents a dead weight per passenger of only 150 lb. It is a repetition of the old instance of the goods wagon where the argument for a greater load capacity was based upon the economic gain in the better relationship of tare to gross weight. The main weight of the empty omnibus is already there in the present small vehicle and the increase in weight for the increase in capacity is very slight. A better distribution of the load over the four wheels, improved springing and more resilient tires will mean less and not more road shock and vibration for the augmented weight. While, therefore, there is an excellent case for a larger omnibus, opinion is divided upon the question

[2][In the article by Walter Jackson on London Tubes and Buses, ELECTRIC RAILWAY JOURNAL, Oct. 11, 1919, page 708, the over-all schedule speed of the buses as officially approved by the company is given as 8¾ m.p.h. This discrepancy may be due to the data having been taken at different periods or under dissimilar conditions.—EDITORS.]

whether the tram is not too large and cumbersome. Certainly it is slow and ponderous in operation, and. as the figures given above show, is a much less efficient vehicle from the point of view of dead weight.

The maximum capacity of a transport agency turns not only upon the possible size of the traffic units employed but also upon the frequency of service with which they can be operated. It is possible with electrically controlled automatic signaling to bring the capacity of a single track of railway up to 40 trains in the hour in one direction. The highest number worked in one hour on the underground system has been 43. The number of passengers which can be carried in the hour on the basis of the seating capacity of the trains is therefore about 13,500, or with 50 per cent of standing load about 20,000. A tramway track worked by trams and trailers attached is found by observation to permit of the movement of sixty-five units in one direction in the hour. The number of passengers which can be carried in the hour on the basis of the seating capacity is therefore about 8,500, or with a complement of standing passengers about 10,000. It is not suggested that sixty-five is the maximum possible movement. American results would suggest a higher figure by about 25 per cent, but to secure this a considerable simplification of routes and track would be necessary.[3] The maximum possible passenger movement may be taken as 12,500. An arterial road used by motor omnibuses is found by observation to permit of the working of 150 in each direction in the hour, which on the basis of forty-six passengers to the vehicle means a total possible passenger movement of about 7,000 in the hour, or, on the basis of fifty-six passengers to the vehicle, 8,500. In comparing tram and omnibus it is assumed that the roadway is sufficiently wide to permit of at least four lines of traffic, two in each direction; a less width were unsuited to metropolitan street conditions.

The railway on these figures is clearly best adapted to the movement of heavy densities of passengers, the tramway second, the motor route third, the difference between tramway and motor route constantly diminishing. The conclusion already indicated is therefore confirmed, which is that railways are essential to free and extensive passenger movement in a metropolitan area, and that as auxiliary to railways, which take off the heaviest traffic, the motor omnibus has distinct advantages over the tram.

Cost of All Agencies About the Same

This is more marked if consideration is given to the capital and operating costs. Taking capital first. A railway underground costs between four and five times a tramway, leaving out of count the cost of the street to the tramway and the cost of the acquisition of rights of way to the railway. If street cost were added to the tramway there would be many instances where it amounted to more than a railway. A tramway for a given maximum service costs more than thrice as much as a motor route worked to the same extent, ignoring differences in seating capacity. Next, taking operation, a tramway and a motor route cost per mile run almost the same sum, as might be expected, the advantage resting with the tramway, and both cost over half as much again as a car-mile on a railway. If all elements of cost, *i.e.*, operating expenses, reserves, fixed charges and reasonable interest, are brought together it will be found that the costs of the various transport agencies are approximately alike, being in the ratio of 21 for a railway car-mile to 22 for a tramway car-mile and 20 for a motor omnibus-mile.[4] It is only fair to add that the seating capacity is as 48 is to 78 is to 46, so that the cost per seat-mile is as 44 for a train is to 27 for a tram is to 43 for an omnibus, which brings out the economic advantage of the tramway. This economic advantage is, however, lost by the operation of lightly loaded large units throughout the day. If, in place of the seating capacity, the average passenger load carried were applied the ratio would be as 123 is to 71 is to 74. On this basis it is seen the same factor now prejudices even more severely the railway.

Scientific Allocation Desirable

A study of the performance and functions of the various transport agencies on these lines is the only way by which a scientific and accurate allocation of duties in the carrying of metropolitan passenger traffic can be assured. Maybe there is a want of dispassionate argument in this paper, and it can only be put forward as an index to what is required. Unfortunately, while the case against the tramways from several points of view appears very strong, there is a large vested interest in the tramways of London already in existence amounting to £23,000,000. It is impossible in these days of economic hardship to advocate a bold and courageous policy of scrapping, even if it were right. The evidence is not sufficient to warrant the assumption that it is right, but it is sufficient to deter any further ventures in tramway enlargement and construction.[5]

The program before a tramway undertaking upon a review of modern progress must, it is suggested, be limited to the consolidation and completion of the existing system, the straightening out of routes and the modernization of their equipment. A policy of rerouting cars is adopted frequently in American cities, and every effort is made so to arrange the routes as to avoid intersections. By this means over 180 cars, including trailers, can be moved over a single line of track in the hour. The size and arrangement of cars are tested in relation to the speed of operation, and the smaller car used in England giving a higher speed has been the general tendency in design as giving a maximum result. One-man cars equipped with safety devices are being freely adopted and present advantages which must always seem denied to a motor omnibus. By these means tramways are made more effective, but all these means cannot confer on them a capacity which will enable them to maintain their position as against railways in a metropolitan area. This decision may come hardly to a tramway man and to a tramway authority. And here is the real difficulty: A tramway authority is a local authority, tramway capital is public money.

[3] [In a report on Detroit in 1915 by Barclay, Parsons & Klapp, data are given showing the movement of 167 cars north bound and 167 south bound cars per hour on Woodward Avenue, 205 south bound and 189 northbound at Michigan and Fort and 181 cars in each direction per hour at Congress, Larned and Jefferson. This heavy traffic is opposed by conflicting traffic on cross streets amounting to 116 west bound and 45 east bound cars per hour on State Street, more than 100 cars per hour in each direction on Michigan and Monroe, 52 west bound and 56 east bound cars per hour on Fort and 85 west and 42 east bound cars per hour on Jefferson.—EDITORS.]

[4] Based on the costs at the close of the year 1919. [Author's note.]

[5] This paragraph refers only to metropolitan areas in which considerable distances are to be covered. The tramway is accepted as the most efficient means of local communication in well-developed cities of a diameter not exceeding 10 to 12 miles. The provincial tramway systems are eminently well adapted to provincial requirements at this stage of development. [Author's note.]

Politics conflict with a decision on scientific and statistical grounds.

And so the last part of this article is reached. How is the conflict of interests in London to be cleared up? How are traffic considerations to be divorced from politics?

CONCLUSION

The essential condition precedent to any attempt to achieve a satisfactory solution is to secure a unity of financial interest, not at all necessarily by municipal or state ownership, but preferably by a traffic pool, out of which the losses of one transport agency may be met out of the gains of another—a legitimate procedure where the gains on one side and the losses on the other side are the consequence of interference by some outside authority. Only where it has at its disposal the means to administer justice can any authority that may be set up enter safely upon a policy of interference with transport undertakings established and conducted with statutory or public sanction.

Upon the form there is no doubt that a single dictator would be most effective if he had a wise experience and a careful judgment. Because they doubt the existence of such a dictator, the advocates of bureaucratic control fall back on the combined wisdom and experience of three, and trust to the clash of opinion among them to insure a reasonable measure of good judgment. But opposed to them are other advocates who think that a bureaucratic control is contrary to the spirit of our English institutions, that executive action must be approved and confirmed by some representative body who must be responsible to the citizens for such action. The difficulties which beset this view are serious. A representative body is unwieldy, unswift, uncertain and uninformed. On the other hand it is always imbued with a spirit of compromise and endowed with a liberal measure of common sense, so long as the questions debated in it are not colored by party politics. There is the risk that traffic being mixed with party politics now, it may not be possible to unravel the two, and in such event control of traffic by a representative body becomes hopeless of benefit.

It is interesting to review in this connection the extent to which the local authorities have provided transport facilities compared with the extent to which private undertakers have done the same. The public moneys of the local authorities of Greater London invested in traffic facilities amount to about £18,000,000, but the public's own private investments in traffic facilities amount to about £80,000,000. The average dividend on the private investment as a whole has been about 3 per cent at the best. The average dividend on the public money has been higher, being about 3½ per cent. There are no profits to limit. Whoever owns the transport facilities becomes an academic question when the rate of interest on the capital will be the same whatever happens.

There are two alternative solutions of the problem of traffic control in London. There is the board or commission of three members, whose task is that of adjudicating in a fair and impartial manner upon the disputes coming before them with a view to smoothing out all the obstacles to a co-ordination and development of all transport agencies. Or there is the turning over of all transport agencies to private enterprise and the arming of the local authorities, severally and jointly, with such powers as may be requisite to secure the conduct of traffic in a fair and impartial manner toward the public. It is hard to conceive a permanent solution which is a compromise from one or other of these alternatives—a statutory independent board, or an elective representative authority.

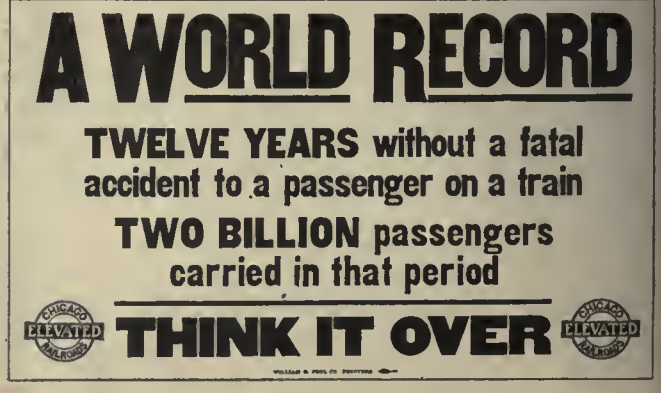
The advantage of private enterprise is that the business must be managed and conducted on a commercial basis, even on a competitive basis. We are apt today to underrate the advantages of the commercial outlook upon which the industry and prosperity of the country have been established in the past. The new spirit in affairs fights shy of the commercial spirit. It is agreed that they are not the same, but they are not antagonistic like oil and water; they will blend, and in their blending is the hope of the future. This admission is not to be taken as contradictory to the view already expressed that an ultimate unity of financial interest is the condition precedent to successful co-ordination. Competitive management does not imply competitive finance. The various transport agencies of London have their periods of prosperity and their periods of failure. Thrice already the omnibus industry has risen to opulence only to fall later into penury. When the common fund was set up under the London electric railway companies facilities act, 1915, the London General Omnibus Company was well enough off to assist the underground railways.

At the close of 1919, the underground railways had to come to the assistance of the omnibus company to meet its working costs. The old saying that what you gain on the swings you lose on the roundabouts is very applicable to London traffic and affords a good reason for some pooling scheme, which, subject to full publicity and with the supervision of those concerned with the public interests, cannot but be helpful and fair to all concerned.

The conclusions appear simple, but it is appearance only; underlying each of them, as this article has attempted to show, are controversies which can only be settled by men of good will.

Chicago Elevated Safety Record

IT WAS mentioned in the Jan. 31 issue of the ELECTRIC RAILWAY JOURNAL that the Chicago Elevated Railways was displaying a car card calling the public's attention to the wonderful record of the company in the matter of fatal accidents. The card referred to has since been obtained and is reproduced in the accompanying illustration.



SAFETY RECORD DISPLAYED ON POSTERS

Railway Operation in Buenos Aires

Railways Contribute to Pension Fund—City Fixes Wages for Employees—Thrift Stamps Used as Change—Cost Data

IN December, 1918, the street railway companies of Buenos Aires, the Anglo-Argentine Tramway Company and the Lacroze Tramway Company, presented a joint petition to the municipality asking for an increase of 2 cents (0.85 American cents) in the 10-cent fare (4.25 American cents), at the same time requesting the Mayor to appoint three municipal accountants to examine the financial and economic condition of the companies.

The street railway companies were forced to take this step because of the necessity of obtaining relief from the desperate financial condition brought about by the enormous increase in the prices of all kinds of equipment and materials, fuel, freights, as well as by the loss in traffic, increase of wages, the establishment of the eight-hour day and the threatened adoption of the pension law, which would oblige the companies to contribute to the pension fund 8 per cent of the wages of their employees and workmen.

Three accountants were appointed by the Mayor, who made thorough investigation of the financial condition of the companies. In regard to the pension law they reached the conclusion that, legally, the companies could not be forced to contribute to the fund, since, under the terms of the concession, the taxation, which already amounts to more than 10 per cent of the gross receipts, cannot be further increased except with the consent of the companies. They proved also that it was financially impossible for the companies to comply with the pension law, the eight-hour day ordinance or the workmen's demands for an increase in wages.

The new burdens that would be imposed on the companies are shown in the following table:

	Anglo-Argentine Company	Lacroze Company
Contribution of 8 per cent of wages of employees to pension fund	$480,000	$87,000
Increase in wages required by the minimum wage ordinance	260,000	35,000
Increase in number of workmen and consequent wage increase, due to the eight-hour day ordinance	480,000	85,000
General increase of 10 per cent in workmen's wages	570,000	140,000
Total	$1,790,000	$347,000

The net earnings of the Anglo-Argentine Company dropped from $5,400,000 (American) in 1913 to $3,300,000 in 1918, while the capital investment in 1918 was $96,000,000. The annual interest charge alone on debentures amounts to $2,650,000. This company has not paid dividends on the common stock since 1914, on the second preferred stock since 1916 or on the first preferred since 1917. The net earnings of the Lacroze company dropped from $845,000 in 1916 to $680,000 in 1918. The company has a capital of $10,650,000 with a yearly interest charge on debentures of $478,000.

As the present fare could not produce a sufficient revenue properly to provide for depreciation and give an adequate return on the capital invested and leave a fair surplus for emergencies the committee of accountants studied different methods to obtain the relief asked for by the companies and reached the conclusion that the fairest solution for all concerned was to grant the petition for an increase of fares.

After the several hearings and one year after the petition was filed the City Council granted the increase of fares by introducing the following amendment to the concession, which recognizes the fact that every burden which is imposed on a public utility necessarily must eventually be transferred to the car rider.

ARTICLE 1—The city will enter into a new contract with the Anglo-Argentine and the Lacroze Tramway companies authorizing them to increase to 0.12 pesos paper the uniform tariff established in the ordinance of May, 1904; June, 1908, and December, 1909.

ART. 2—The increase referred to in the aforementioned article will be granted to the companies under fulfillment of the following conditions: (a) Establishment of a minimum daily wage of 4.50 pesos paper, or 120 pesos monthly, for all traffic laborers and workmen above eighteen years of age and 4 pesos paper daily, or 100 pesos monthly, for all car and track cleaners.

(b) Maximum working day shall consist of eight hours and shall not normally be exceeded, but if so, in all cases overtime will be paid separately. In so far as the traffic staff is concerned this wage will be calculated weekly, and in no case shall the working day consist of more than nine hours. The maximum working day for the subway guards and motormen shall consist of seven and one-half hours.

(c) General increase of 10 per cent shall be given on all the present salaries and wages which do not exceed 250 pesos per month.

(d) Immediate contribution by the companies of 8 per cent of all wages and salaries toward the formation of the pension fund.

ART. 3—The city will arrange with the tramway companies for the immediate incorporation, in their respective contracts of concession, of the pension scheme contained in the proposed law sanctioned by the Chamber of Deputies, thereby anticipating its definite promulgation.

ART. 4—The increase of 2 cents paper established in Art. 1 shall rule during the term of three years. In the event of the tariff being reduced to the present 10-cent fare the municipality will come to an understanding with the companies regarding the manner in which the contribution of 8 per cent to the pension fund, referred to in subsection (d) of Art. 2, shall be made.

ART. 5—Within two years following the signature of this contract the Anglo-Argentine and the Lacroze companies shall present to the city complete documentary evidence of their invested capital. All new investments must be approved by the city.

ART. 6—During the existence of this authorization the companies shall not earn a greater net profit than 8 per cent per annum upon the whole of their capital invested and approved, and the municipality shall have ample power to investigate all new authorized investments. Should the yearly balance show a net profit greater than the 8 per cent aforementioned the surplus shall be held by the municipality pending a decision regarding the possibility of reducing the fares. The books, balance sheets, reports and other documents shall be drafted and printed in the national language. The city is free to examine the companies' books and statistics at any time, to ascertain whether they comply with the conditions contained in the present agreement, and each company shall present to the city at the beginning of every half year a complete and detailed balance sheet showing the business records for the preceding year. The companies must not, on any account, impose fines upon their staff.

ART. 7—The workmen's fare shall be maintained at the present 5 cents paper tariff and the transfer tickets shall also be maintained at their present rate of 15 cents paper. In the workmen's cars during the morning hours return tickets will be sold, good for a return trip at any time after mid-day on any surface car.

ART. 8—To facilitate the sale of tickets, the companies are obliged to sell, on all their cars, coupon books containing five and ten coupons each.

ART 9—The Anglo-Argentine company promises to construct 30 km. of new tracks within the term of three years in accordance with specifications to be agreed upon between the municipality and the company.

ART. 10—In the event of any difference of opinion arising between the workmen and the companies, either individually or collectively, regarding labor matters, and always provided that the parties in conflict have been unable to come to an understanding, the company must submit the solution of the conflict to the arbitral judgment of the municipality.

The scarcity of pennies in circulation and the dislike of the people for them because of their large size introduced the difficulty of making change. To solve

this problem the companies, besides selling books of five and ten coupons each for 0.60 and 1.20 pesos paper respectively, are authorized to offer postal saving stamps as change if the people prefer. The companies, however, do not accept these stamps in payment for the tickets or change.

This method is used to develop thrift in the people, and the Postal Savings Bank has extensively advertised this plan in the street cars. If the car rider does not buy coupons and does not have the exact change he is obliged to accept the saving stamps. For example, when he gives the conductor 15 cents the change given back to him is composed of a 2 cent copper and a saving stamp of 1 cent, as the 1 cent coppers are not in general circulation. There are many car riders who prefer the saving stamps to the cumbersome coppers. In exchange for the fare or the coupon the conductor issues to the passenger a fare receipt.

The coupon books are good for two months and the unused coupons are exchanged for new ones at the expiration of the term. To prevent fraud, frequent changes of color, design, etc., are made. The workmen's fare, 5 cents paper, has been unchanged and gives laborers the opportunity to buy during the morning hours, in the workmen's car only, a round-trip ticket for 10 cents paper and to return to work in any surface car after mid-day. The workmen's cars are trailers that run from 5 to 7 a.m.

The price of the transfer has also been unchanged and is 15 cents paper for most changes, including subway to surface lines and *vice versa*.

The minimum wages fixed by the City Council are the same as those fixed for their own workmen and for those of all contractors who are working for the municipality.

By this law the City Council has recognized two rights which are of great importance, *i.e.*, the right to earn an adequate return on the whole of its invested capital and the right to get compensation of some sort for the 8 per cent contribution to the pension fund, in case the fare is reduced to 10 cents after three years. There was no serious objection to the increase in fare on the part of the public.

A list of prices of materials and parts of equipment is given in the accompanying table:

PRICE INCREASE IN THE ARGENTINE

Material	Unit	Cost in Dollars 1914	Cost in Dollars 1919	Per Cent Increase
Metallic filament lamps 25/115	Each	0.138	0.258	92
Controller fingers	Each	0.086	0 345	330
Trolley wire	Ton	396.00	775.00	96
Wheel tires	Each	7.34	43.80	500
Car axles (rough)	Each	9.05	34.50	400
Gears	Each	15.90	40.85	157
Pinions	Each	2.58	7.31	183
Springs (body end)	Each	3.50	9.50	171
Spring (body)	Each	0.22	0.86	292
Brake-shoe head	Each	1.11	2.80	154
Fish plates	Pair	1.51	4.30	186
Steel wire	Lb.	0.54	5.40	900
White enamel paint	Lb.	0.087	0.178	107
Window glass	Box	11.65	32.30	178
Rails	Ton	38.80	103.50	167
Calcium carbide	Lb.	0.055	0.127	132
Wrought iron in bars	Ton	51.80	147.00	183
Varnishes	Gal.	4.12	8.60	109
Sheet bronze	Lb.	0.352	0.714	103
Coke	Ton	21.600	60.30	180
Coal	Ton	25 00	38.900	50
Dynamo oil	Lb.	0.045	0.098	117
Wood (average)	Sq.ft.	0.14	0.23	64
Turpentine oil	....	9.45	25.80	173

Power is purchased and in 1914 the price paid was $0.0268 gold per kilowatt-hour and in 1918 $0.0183 gold per kilowatt-hour. The approximate yearly consumption in kilowatt-hour during 1919 was 59,000,000.

Emergency Welding on a Railway Bridge

A SERIOUS traffic tie-up of considerable duration was recently averted when an emergency thermit welding repair was made on a broken 6-in. main turning shaft of a drawbridge located at North Chelsea, Mass., and over which the Eastern Massachusetts Street Railway operates about 600 cars per day.

When the shaft broke the entire load of turning the drawbridge was thrown upon a companion shaft, which it was feared would not be strong enough to stand the overload. The breaking of the companion shaft would have suspended operation of the drawbridge and the traffic over it for a week before a new shaft could be supplied and machined. In order, therefore, to avoid running this risk an emergency call was made to have it repaired by welding.



BROKEN SHAFT ON DRAWBRIDGE OF THE EASTERN MASSACHUSETTS STREET RAILWAY REPAIRED BY THERMIT WELD

When the shaft was removed from its operating position it was found that the break was located 6 in. from the end and between a 12-in. bearing box and a large cast gear wheel. A weld made at this point would have required machining before the shaft could be replaced in the bearing. To avoid this weakening of the weld, it was decided to cut an additional piece from the shaft and weld on an entire new billet to the end.

By 3 p.m. on the day of the accident the repair operator had arrived from New York and secured the necessary molding materials. The shaft was then lined up, a mold was built around the part to be welded, the mold was preheated and the molten steel was poured into the mold at 10:30 that night. In making the weld 125 lb. of thermit was used. The following day the mold was stripped, the billet was machined and the shaft returned to operation. An accompanying illustration was taken after the shaft had been back in operation for about a month.

Immigration Increases Slowly

THE agricultural and industrial demands for skilled labor, which are so evident throughout the country, have in no way been satisfied by the apparent increase in immigration to the United States during the past few months, according to a recent bulletin of the Inter-Racial Council, despite the fact that the total number of persons admitted is now greater than the total number departed. During the last half of 1919 the total number admitted was 162,883 and departed 166,212, a net loss of 3,329. In the same six months of 1913 (the last year of our normal immigration) the total number admitted was 734,869 and departed 153,790, a net gain of 581,079. During the first five months of 1920 the preliminary figures for the port of New York (which usually handles about 80 per cent of the total

immigration and emigration for the country) show admitted 153,241 and departed 114,953.

It appears, however, that practically all of those who left the United States during these five months were able-bodied male wage earners, while of those who entered about half were women and children and a large part of the balance were natives of Italy and returning reservists. Many of the men admitted had previously been in the United States and practically all of them had definite destinations and knew exactly where they wanted to go. Comparatively few new able-bodied aliens are arriving, as a number of the European countries do not yet permit men of military age to leave their borders. Other causes given are our strict passport regulations and the enforcement of the literacy test.

Johannesburg Builds Own Car Bodies

THE Johannesburg Municipality was unable to obtain electric cars for its system during the war period. At its close, however, it ordered trucks sufficient for forty cars from the United States and is now building the bodies of these cars in its own shops. These cars will be of double-deck construction, the upper deck being entirely inclosed. The seating capacity will be about eighty passengers. These cars will be fitted with Westinghouse brakes and General Electric control equipment. In addition to these forty cars, five single-truck cars are also being built in the shops especially for natives (blacks). The accompanying illustrations show the general arrangement of the shops at Johannesburg, as well as the type of cars and trucks that are used. The municipality now owns 120 passenger cars, and the rapid growth of the service makes it evident that extensive additions will be needed shortly.

Screw Thread Commission Reports

THE National Screw Thread Commission, first authorized by Congress in July, 1918, has reported to the Secretaries of War, the Navy and Commerce and recommends for approval six series of threads. The aim of the commission has been to eliminate all unnecessary sizes, and in addition to utilize present predominating sizes as far as possible. While from certain standpoints it would have been desirable to make simplifications in the thread systems and to establish consistent standards more thoroughly, it is believed that any radical change at present would be out of place, would interfere with manufacturing conditions, and would involve great economic loss.

The law provides that when the report is thus approved, it is binding upon all the departments in question and also must be used by other federal departments whenever possible.

The recommendations include a coarse-thread series, which is the present United States standard thread, supplemented below ¼ in. by the standard established by the American Society of Mechanical Engineers; a fine-thread series consisting of sizes taken from the standards of the Society of Automotive Engineers and the fine-thread series of the American Society of Mechanical Engineers. The committee also recommends the adoption in practically its present state of the American Briggs standard pipe thread sizes, as recommended by the American Society of Mechanical Engineers, and the fire-hose coupling sizes as established by the National Fire Protection Association. The report includes specifications, form of thread, gages, classification and tolerances. The full text of the report will be presented and will be available for distribution in a few months.



UPPER LEFT, SINGLE-TRUCK CARS BEING REPAIRED. UPPER RIGHT, GENERAL VIEW OF REPAIR SHOP. LOWER LEFT, THE WOODWORK DEPARTMENT FOR BUILDING ELECTRIC CARS. LOWER RIGHT, ONE OF THE STEAM HAMMERS IN THE MUNICIPAL TRAMWORKS

Employment Bureau for Trainmen

Cleveland Railway Creates New Department to Hire Men and Give Preliminary Training—New Building and Equipment

THE Cleveland Railway Company has created a bureau of employment, with H. W. Palmer as superintendent, for the purpose of concentrating the responsibility of hiring trainmen and giving them their preliminary training as motormen and conductors. About fifty men a week are taken on and put through the three days' preliminary training at the bureau of employment and then turned over to the several division superintendents to complete their ten-day instruction period. Before they are actually put on the pay roll they are sent back to Mr. Palmer, who thus has another opportunity for a final catechism and lecture. During the first three days those in charge of the course make every effort to win the interest of the men by explaining rules and equipment in great detail to them and answering all questions, carefully avoiding any appearance of bullying or attempting to embarrass the new men.

A new one-story six-room brick office building to house the bureau of employment was built on a piece of land included in the tract on which are located the Harvard shops and Harvard track storage yard. A man applying for a job is received in the superintendent's office at the front of the building. If he looks like



OFFICE BUILDING FOR THE NEW BUREAU OF EMPLOYMENT, CLEVELAND

good material he is sent into the adjacent room, where there are tables and facilities for filling out an application. When this is completed he is sent into the adjoining room, where there is a full equipment for making the physical examination and taking a photograph. From this point on, if a man qualifies, he is taken through the three-day preliminary training school in a class of perhaps ten men. After completing the physical examination, he is told to report the next day at a certain time to attend the class.

Upon reporting the students assemble in the lecture room, which is equipped with standard side-arm classroom benches. They start with a course of instruction and practice in filling out accident reports, trip sheets, turn-in envelopes, shop reports, witness blanks for accidents, etc. This is followed or accompanied by a thorough lecture on accidents, wherein the principal points are emphasized and an effort made to fix them in the trainmen's minds by the use of a number of posters fastened on the wall across the front of the lecture room.

In the room adjacent to the lecture room there has been installed the central section of a standard Cleveland street car. This is equipped with fare-box, air-operated doors, signals, selective lighting switch, etc. Taking turns, each man in the class acts as conductor and the rest of the class as passengers, and they give each other experience in handling tickets, change and transfers, and in the general duties of a conductor. This part of the equipment of the bureau of employment is of course primarily for conductors.

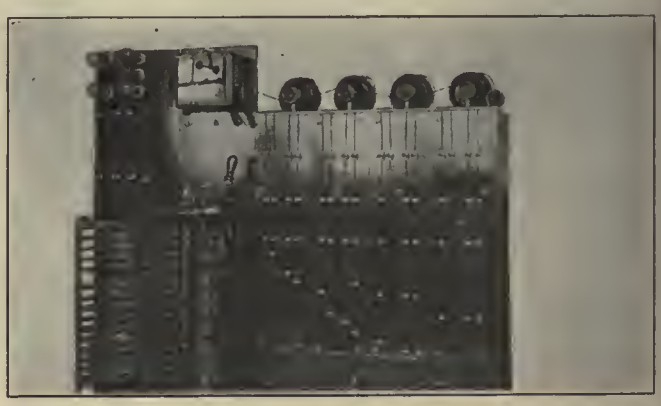


SECTION OF CAR FOR DEMONSTRATING CONDUCTOR'S DUTIES

In a glass covered cabinet extending along two sides of this room are posted the schedules for all the city runs. From these the men are required to copy the running time for various assigned runs and to make out the full schedule for the runs, including the time points.

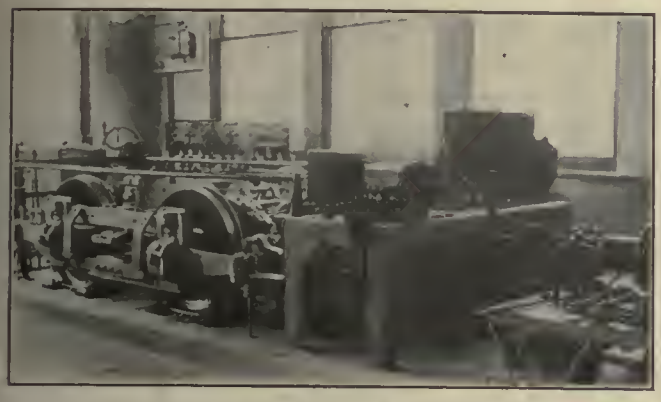
The sixth room of the building is equipped primarily for the motormen. Four 0.3-hp. series motors, belted together and to a flywheel for load, are connected up with open wiring to a standard K controller. The circuit includes a standard circuit breaker fitted with a glass case, lamps in series with the resistance notches on the controller, and plug type switches in the armature and field circuit of each motor. Speeding up the controller too rapidly will throw the circuit breaker, thus demonstrating proper feeding. The interior mechanism of the circuit breaker can also be observed. With the lamps lighting on the resistance notches and going out on the running notches the student will readily see where he should and should not leave his controller standing, and why. The plug switches make it readily possible to create an open or short circuit in the armature or field circuit of any motor and then demonstrate to the student how to cut out this trouble.

The other equipment of this room includes a standard controller, hand-brake and air-brake equipment connected up to a standard truck fully equipped with motors and brake rigging. A circuit breaker, resistance grids, air compressor, governor, etc., are also connected up to



STANDARD CONTROLLER AND CIRCUIT BREAKER CONNECTED UP TO FOUR SMALL MOTORS TO DEMONSTRATE STEPS IN CONTROL AND ELIMINATION OF TROUBLE

represent the working parts of a car. There is also a small truck representing a trailer, which is equipped with the full air-brake equipment and an automatic coupler. This truck is moved up to the coupler on the rear end of what represents the motor car by means of an air cylinder installed underneath. This makes it possible to demonstrate the process of coupling and



STANDARD TRUCK WITH FULL MOTOR AND AIR-BRAKE EQUIPMENT, INCLUDING TRAILER AIR-BRAKE EQUIPMENT AS SEEN AT EXTREME RIGHT

thereafter the action of the brake mechanism on motor car and trailer combined.

In giving a class of men their first lesson on this equipment Mr. Palmer first operates the controller and air brakes, showing the action of the large motors and change of speed with the different controller positions, the trucks being supported so that the wheels are free to revolve. After a lecture explaining the function and operation of each part each man in the class is told to operate the controller and air brakes. Mr. Palmer says that he can practically tell by the way a man steps up to the controller whether he will make a good motorman.

Seeing the various parts of a car close up, and having the complete operation and inter-relation of parts fully explained and demonstrated, the officials believe the student is in a much better position to profit by his experience on the platform of a car, for he then has some notion of what is going on underneath the car in response to his own control.

Well-Designed Oil Houses

IN A recent bulletin, No. 34, of the National Safety Council some desirable construction details for oil houses are given. This states that an oil house should preferably be a separate detached building of fire-resisting construction. A well-designed oil house would properly have the walls made of brick, stone or concrete, the roof of concrete without exposed metal and the floor of concrete drained to one point to a sewer through properly designed traps or oil separators. The door sill should be raised about 6 in. and the door should be metal covered and hung on an angle iron frame. The windows should have metal frames and wire glass and a drain pipe should extend from the floor through the roof.

If there is sufficient space a satisfactory oil house may have walls and roof made of corrugated iron or steel on steel or timber frames. Containers should not be placed on wooden racks, but upon the cement floor or upon concrete, metal or other fire-resisting racks or shelves.

Under certain conditions it may be necessary or desirable to provide an oil room inside a building for the storage of limited quantities of inflammable liquids. Inside oil rooms should have the walls, floor and ceiling made of brick or concrete 8 in. thick, or of reinforced concrete 4 in. thick. All openings into the room should be provided with automatically closing fire doors; windows should be of wired glass in metallic sash and frames. To prevent the accumulation of vapors in pits and other confined places inside, oil rooms should not be below the grade lines nor immediately above a cellar or basement. Door openings should have sills raised 6 in. The floor should be waterproof and continued up the side walls about 3 in., making rounded corners that can be easily washed and cleaned. The floors should pitch to a drain pipe leading outside to a catch basin or terminating at a point where proper precautions have been taken so that surrounding property will not be in danger. No drain pipe should be made direct to sewer.

Proper ventilation should be provided for inside oil rooms. There is no system of ventilation that is applicable in all cases. The method adopted necessarily varies with the nature of the gas or vapor to be removed and depends upon whether it is heavier or lighter than air. Ventilation may be secured by arranging suitably screened openings near the floor or near the ceiling or both. It may be necessary to provide a similar system for exhaust ventilation by installing screw propeller fans at windows or at other openings in the wall. In such cases care must be exercised to prevent the exhausted gases or vapors from returning into the room or from entering any other place where their presence would be objectionable or dangerous. Fans should be driven by explosion proof motors or by belt and shafting. An exhaust system, with hoods which catch the gas or vapor at the point of origin, is likely to be more satisfactory than general room ventilation.

A Fine Car for a Warm Day

AN INVENTION which is being tried out in Durbeck, Col., is a street car body which has been fitted with a propeller and its driving motor. No surface rails are employed, the car being hung from an overhead trolley bar. The inventor is said to be contemplating the addition of a second propeller for use in case the original one is disabled. Information is not available as to the hopes of the inventor of this novel transportation unit in regard to the field which it might occupy, that is, whether he expects it to depose the standard car or merely to serve as a coin-getter in parks and the like.



Photograph from "World-Wide Photos"

NOT A BIRD CAGE, BUT A CAR WITH AIR PROPELLER DRIVE

Pacific Electric's Automatic Flagman

An Automatic Flagman of the Magnetic Type with the Warning Disk Swinging Downward Is Giving Excellent Results

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

IN a previous article published in the August 11, 1917, issue of the ELECTRIC RAILWAY JOURNAL an automatic flagman then in use on the Pacific Electric Railway's lines was described, together with some experiences in the developing of an electrically operated device of this character. Since that time further improvements have been made. The former magnetic type was designed so that the warning disk was elevated above the magnetic control box, and when set in motion the movement of the disk was in a horizontal direction. In the improved type the disk on the apparatus hangs and swings downward when placed in operation.

This flagman has no motors or gears, but is controlled by two sets of magnets, which when energized pull an armature from one side to the other, causing the warning disk to swing and a gong to sound.



AT LEFT, SUPERSEDED TYPE OF MAGNETIC-AUTOMATIC FLAGMAN. AT RIGHT, LATEST IMPROVED TYPE OF AUTOMATIC FLAGMAN USED ON THE PACIFIC ELECTRIC RAILWAY

For operating and controlling the flagman a contactor brush is placed on the trolley wire at a distance of approximately 1,500 ft. from the crossing protected. When the trolley wheels of an approaching train or car engage this brush it closes a circuit between it and the trolley wire and current is transmitted over the signal line to the relay signal. The operation of this relay closes the local circuit to the bell and sets the warning signal in motion. Another brush placed upon the trolley wire beyond the crossing causes the bell to come to rest when the trolley wheel of a passing car or train engages it. All lines are provided with intermediate and second intermediate contactors, which operate the relay in case trains are traveling close together, thereby preventing trains from crossing on a dead signal. The line wire used is No. 12 weatherproof iron wire, which was the same for the former magnetic type. The trunking and cable now used is No. 12 Kerite insulated wire.

The Pacific Electric Railway has 250 of these devices.

Features of South Water Street, Chicago, Improvement

Proposed Plan of Constructing Two-Level Marginal Thoroughfare Would Greatly Relieve Traffic Congestion in Loop District

J. ROWLAND BIBBINS, supervising engineer, the Arnold Company, Chicago, has made a report to the Chicago Plan Commission in connection with the improvement of the riverfront, which has a very direct bearing on the general traffic conditions in Chicago's Loop District. The South Water Street commission merchants are expected to remove their business center to some more logical point and the space now occupied by their buildings and the street, according to the plan, would be occupied by a two-level thoroughfare extending west and south along the river from the new Michigan Boulevard two-level bridge recently completed.

The principal features of the project are summed up as being to provide a new trunk highway or broad marginal street around the Loop boundaries; a distributing road from the great Michigan Boulevard which will greatly reduce the cross traffic interference in the Loop; traffic segregation, freight vehicles below, fast vehicles above; an upper level equalized with the level of the river bridges and a lower level equalized with the dock level; continuous dockage along the riverfront; a clear by-pass route between the north and west sides of the city, avoiding traversing the Loop streets; unobstructed motor by-pass routes between freight streets; increased use of the Chicago freight tunnel system; union freight station facilities, convenient to both the Loop and the docks; relief of the central business district streets from freight traffic, and a number of other advantages.

One of the controlling considerations in developing the proposed plan was the enormous increase in the number of motor vehicles in Chicago. The January, 1920, registration shows a total of 74,112 passenger motor vehicles and 19,373 motor trucks within the City of Chicago. This is an increase of 100 per cent in four years. The construction of the two-level riverfront road would greatly facilitate the movement of these vehicles through its by-pass and distributing advantages. Thus the principal accomplishment of the proposed plan would be the elimination in very large measure of the trucking of freight which now takes place on the Loop streets.

The principal group of freight terminals is now and will be for many years located in a pocket at the northwest corner of the Loop District, necessitating a great volume of trucking across the Loop. The next important group, in the Twelfth Street district, also requires much trucking across the Loop at present, both transfer and consigned freight. The development of by-pass trucking routes such as would be provided by this new construction would therefore seem to be the most important need of the present situation, as it would tend materially to lessen the economic loss imposed by the various cumulative delays resulting from increasing railway and street congestion and extra man-handling. Perhaps the greatest sufferers of this character of delay are the surface street railway companies.

The report points out that Chicago's greatest need

is a terminal delivery which will quietly fit into the rail terminal operations and effect the delivery and transfer of tonnage with as little encroachment as possible upon the capacity of downtown streets, whose total capacity is required for retail and general business. Of the possibilities for meeting this need, the report states that the Chicago freight tunnel, already in existence, is of greatest value. The Chicago tunnel has developed unobtrusively a downtown network of 65 miles of freight tunnels connected by elevators with all the freight stations and with most of the large business houses. This tunnel could readily handle from 70 to 95 per cent of all the l.c.l. freight tendered in most cases. It makes use of 5-ton cars drawn in trains by electric locomotives. But for various reasons the tunnel is being used to less than one-fifth of its capacity of perhaps 10,000 tons per day. To move 10,000 tons per day by truck would require somewhere in the neighborhood of 4,000 motor trucks a day, the report estimates, thus indicating what must be the result from a traffic standpoint of continuing to handle this business district freight by trucks. It is pointed out that the Chicago freight tunnel is the only instance in this country where a complete duplicate sub-level street system has been provided for freight haulage. As such, it must be regarded as an important element in local freight transportation and one to be conserved, if for no other reason than to contribute to the relief of street congestion. From the standpoint of the City of Chicago, no transportation agency could be more effective in solving the problem of existing street capacity and no effort should be spared to make this institution one of permanent success.

In justifying the marginal street plan to relieve congestion in the Loop, the report points out that "there is only one general solution to the problem of street capacity in downtown Chicago, namely, by double-decking, either by elevating the streets for fast vehicles or pedestrians or depressing the car lines below the present streets. The first alternative seems problematical, at least until far in the future. Passenger subways are of course practicable, but offer an available solution only if the city can be prevailed upon to act promptly. But even with all this possible increase in effective capacity, there still remains the fact that the efficiency and usefulness of all the Loop streets as distributors could be vastly improved by means of unobstructed clearing or marginal thoroughfares. Such a system of marginal clearing streets is introduced by the South Water Street improvement."

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Many Committee Meetings

THE last few weeks have been busy ones at Association headquarters, with many committee meetings scheduled, to complete reports due for the October meeting.

During the week ended July 31 three committees held meetings, namely, those on merchandising transportation, collection and registration of fares and entertainment. During the current week a meeting was held of the committee on code of traffic principles, and as this paper is going to press a two days' meeting is being held of the standards committee of the Engineering Association.

Statistics Recently Compiled

THE Bureau of Information and Service of the American Electric Railway Association announces the completion during July, 1920, of the following special compilations and reports. These are available to member companies on request.

"A Series of Charts Showing Effects of Increases in Rates or Fares on Operating Revenues and Passengers Carried, for a Number of Typical Companies."

"A Bulletin on Wages and Working Conditions of Street Railway Employees Other than Trainmen." This covers employees in the engineering department, shops, carhouses, substations, power houses, overhead lines, maintenance of way and transportation departments.

"Claims Statistics." This is a summary of the replies of companies to Data Sheet 207, showing classified expenditures by the claims department of various companies and the number and cost of various kinds of accidents.

"Summary of Electric Railway Strikes for the Years 1918, 1919 and 1920 to Date." This contains a brief account of each individual strike.

"Legal Requirements Covering the Carrying of Jacks on Cars." This compilation is based on replies to the circular letter issued by the bureau and dated June 11, 1920.

In addition to the above, the bulletins on wages of trainmen, cost of living studies, bulletins on the fare situation, covering all cities having increased rates and those in which fares have not been increased; and regulations covering restrictions of jitney operation, have all been brought up to date.

Letter to the Editors

Standardize Motor Bearings

NEWPORT NEWS AND HAMPTON RAILWAY, GAS & ELECTRIC COMPANY

HAMPTON, VA., Aug. 4, 1920.

To the Editors:

In its July 10 issue ELECTRIC RAILWAY JOURNAL published an article by R. H. Dalgleish entitled "Let's Dig Ourselves Out." One point brought out in this article appeals strongly to me and I believe it well worth consideration by electric railway engineers. It is the standardization of wearing parts of equipment. I agree with Mr. Dalgleish that interchangeability of parts is desirable and feel that much good would be accomplished if the matter were given serious consideration.

For illustration, why not start with motor bearings. Surely different makes of motors of the same horsepower could be designed to use the same size bearings and not hinder the development of new motors.

I would like to see the matter referred to the standards committee of the Engineering Association for discussion and recommendation.

N. E. DREXLER,
Chief Engineer.

Recent Happenings in Great Britain

Difficulties of London County Council in Getting Right for Extensions—Through Municipal Bus Service Delayed

From Our Regular Correspondent

A fine example of how man proposes but the gods dispose is to be found in the fate of the bill promoted in Parliament by the London County Council to authorize it to construct additional tramways and to run motor omnibuses as linking routes to and extensions of the tramways. Man in this case is the County Council and the gods are the London borough councils and Parliament. When any of the other great municipalities in England promote a parliamentary bill for the purpose of extending tramways or running omnibuses there is usually not much difficulty in obtaining the powers desired. But when London County Council tries the same game a veritable hornet's nest of local interests is stirred up against them, and Parliament is so influenced that little success is obtainable. The borough councils under their power of veto choked off the tramway proposals.

As to the powers for omnibuses, the County Council has tried to get these before without success, though other municipalities get them almost as a matter of course. A committee of the House of Commons heard evidence and arguments at great length during June for and against the Council's omnibus proposals, and on July 1 it decided to grant the Council power to run omnibuses in a considerable area of Central London, for the purpose of linking together central tramway termini, but it refused to assent to other proposals to enable the Council to work omnibuses to connect tramway routes in the suburbs and to serve housing schemes either within or without the county of London. The monopolistic hold which the London General Omnibus Company has with regard to omnibuses all over the London area is no doubt a factor in this decision. The committee also stated that the County Council would have to satisfy the Ministry of Transport that the proposed services were for linking together tramway routes and were not general roving services.

Bus Plan Outlined

Some little time before the decision of the committee was given, an important agreement was reached between three county councils in the adjoining metropolitan area in regard to the running of omnibuses. Though the agreement was subject to the passing by Parliament of certain bills, and though the London bill has for the most part been rejected, the principle involved in the agreement is of much importance as pointing the line of future development in the working of municipal omnibus services. The proposed scheme, now of course in abeyance, may accordingly be outlined. The London County Council proposal was to run omnibuses not only in the county of London but in the parts of the metropolitan police district which extend into the counties of Middlesex and Hartford. The councils of these two counties petitioned against the London Council's proposal, but at the same time they were promoting bills to enable them to run omnibuses within the metropolitan police district where they would be in competition with other local omnibus companies.

It was arranged that clauses should be inserted in the three bills of a kind already approved by the Minister of Transport in the case of several bills promoted by provincial local authorities in which it is proposed to enable the local authority to work omnibuses outside its own district. The main provision is that each county council running omnibuses outside its own county shall pay to the appropriate road authority for road maintenance such sum per bus-mile as may be agreed, or, failing agreement, as determined by the Minister of Transport. Provision is also made for similar agreement or determination as to payment toward the cost of any necessary adaptation or reconstruction of roads for the omnibus traffic.

Now that the London County Council's proposals as regards the outer areas have been rejected the matter is once more in the melting pot. There are only two possible satisfactory solutions. One is the constitution by act of Parliament of the proposed London Traffic Authority with full powers over the whole of the metropolitan police district (which extends far beyond London proper). The other is to give the whole control to a special department of the Ministry of Transport. The main difficulty in the way is the multitude of conflicting interests, both of local authorities and of companies. These will have to be overcome if chaos is to be removed.

Ministry of Transport Attacked

There was a good deal of Parliamentary excitement and of outside interest in the end of June and the beginning of July over the first annual estimates of the Ministry of Transport, which, it may be recalled, was established in August of last year. The Parliamentary opposition averred that the Ministry was of no use and should be abolished, while its supporters pointed to good work done and to the absurdity of expecting large results in such a gigantic new undertaking in such a short time. The debates were confined almost entirely to the steam railway aspects of the subject. Meantime the Ministry of Transport has issued an official memorandum advising the amalgamation of all the main railway companies of the country into half a dozen great groups for the purposes of consolidation, co-ordination and economy of working. In order to carry out such a scheme new legislation will be required, and that can hardly come this year. There promises to be great opposition to it. The main electric traction interest in the proposal is the suggestion that one of the groups should consist of the London local railways.

Glasgow Lines Show Deficit

For the first time on record the accounts of the Glasgow Corporation Tramways show a deficit. This, it may be recalled, is the undertaking which has enjoyed such a career of prosperity that some two years ago it completed the repayment of its capital, so that interest and sinking fund charges ceased to exist. In spite of this, the net profit a year ago had, owing to the continual rise in working expenses, fallen to £14,772. The accounts for the year ended May 31 last bring out a loss of £108,531. It is fair to say, however, that this result is arrived at after setting aside to renewal and depreciation funds a sum of £186,242. Apart from this there would have been a credit balance.

At a meeting of the Glasgow Town Council on July 8 Mr. Kelly, the chairman of the tramways committee, said that the increased revenue they had received since the fares were raised on June 1, which date was the beginning of the new financial year, was most satisfactory, and if the increase was continued they would have an additional revenue at the end of the financial year of between £400,000 and £500,000.

The accounts issued a year ago of London County Council tramways showed that they were just about making ends meet without allowing for renewals and depreciation fund. The accounts issued on July 3 for the year ended March 31 last show a much worse state of things, for they bring out a deficiency of £100,722. This will be increased to £161,511 if the government decides that all renewals must be met out of revenue. The last increase in fares did not come in time to affect these accounts, but on the other hand neither did the last large increase in wages. The revised estimates for the year now current show a deficit of £749,442, which will be increased to £929,512 if the government does not agree to half the cost of renewals being charged to capital, and to no less than £1,038,512 if a proposal to repay the capital debt on the annuity system be not approved. The last mentioned sum is equal to a rate of 6d. in the £1 on all ratable property in the county of London. It is proposed to apply to the Ministry of Transport to sanction an increase of fares above the statutory maximum of 1d. per mile. The general condition of the London County Council tramways is acute and apparently the only relief for the bad financial condition can be expected through increased fares.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Governor to Decide

New York Board Hears Buffalo Wage Case—Company Stands Pat on Open Shop

Governor Alfred E. Smith of New York must take the next step in the wage controversy between union platform employees and the International Railway, Buffalo. The State Labor Board, which heard evidence presented by the employees and the company, adjourned on July 30 without any concessions being made on either side. At the outset of the hearing Herbert G. Tulley, president of the company, filed a formal statement declaring that the company will stand pat on the open shop question and will not consent to make retroactive the wage award which might be agreed upon.

Closed Shop a Failure

The Labor Board was told by President Tulley that the management of the company has been unsuccessful since its relations with the Amalgamated, both in a financial way and in its relations with the public. The board was told that the company desires to establish more direct contact with its employees and will enter into no further contract which does not recognize and assure uninterrupted continuance of the open shop principle.

President Tulley said the International remains ready to accept a third arbitrator appointed by Governor Smith, for the reason that the State will then have the power, through its arbitrator, to determine the rate of wages to be paid, and the State also will have power concurrently to determine and authorize, through the Public Service Commission, the amount of increased fare necessary to make the payment of such increased wages possible.

Questioned regarding the decision of the company not to make retroactive to May 1 any increase in the wage scale which might be agreed upon by the board of arbitration, President Tulley said the wage award could not be made retroactive because of the depleted condition of the company's finances and added that all of the money received by the company in the form of additional revenue from the 7-cent fare had been paid to the employees in higher wages.

Retroactive Pay Opposed

Representatives of the carmen agreed to leave the entire matter in the hands of the arbitrators. James H. Vahey, of Boston, the employees' representative on the board of arbitration, said the open shop is not the bone of contention. He said the men are willing to leave that question also for the arbitrators to decide. Henry W. Killeen, of counsel for the International, contended the question of an open shop is not subject to arbitration.

Charges Union Violence

Charges of violence on the part of union representatives to intimidate non-union employees of the company were made at the hearing by Mr. Killeen, who presented the company's side of the case.

For the present at least the men have given up the idea of a strike. They resolved on this course in compliance with the wishes of the union leaders.

Duluth Men Urge Fare Referendum

Employees of the Duluth (Minn.) Street Railway recently have placed in circulation petitions for a second referendum vote on the 6-cent fare ordinance, defeated at the municipal election on June 21 by a vote of 5,963 to 7,286. Following the rejection of the measure the men asked for an increase in wages. The company refused on the ground that it was unable to pay higher wages from its present revenue. On July 20 the employees struck and car service was suspended for one day. It was agreed that the men should return to work and a new ordinance should be placed before the voters.

The city charter requires that the referendum petition contain the names of 20 per cent of the voters at the last general election. The employees expect to obtain 3,500 names, more than enough to place the ordinance before the people again. The date for the election will be between forty and fifty days after the petition has been accepted by the City Council.

City Attorney John E. Samuelson gave an opinion to the Council that it could not legally pass the fare ordinance at this time because the franchise under which the company is operating and which was granted by the Legislature in 1881 provides that the fare can only be changed at five-year periods. This would tie the Council's hands until 1921, he said. The ordinance which has now been proposed differs from the one submitted last June in that it provides for an increase of 10 per cent in the wages of employees. It is also stipulated that the company shall pay the employees "an amount not less than one-half of the gross passenger revenue received as fares."

Small Road Strike-Ridden

Review of Fare and Wage Vicissitudes of Small Canadian Line—Wages and Fares Raised

The Levis (Que.) County Railway has been the victim recently of a one-day strike and a semi-strike, so to speak. Most of the circumstances attending upon these happenings have however, been brushed away and the company is now operating at an advance in fares and the employees are working at an advance in pay.

Company in a Quandary

The Public Service Commission inquired on May 25 into the finance of the company and the cause of the strike on the part of the employees. Judgment was reserved so far as the motion of the city of Levis and Bienville was concerned. The commission, however, issued an order to the company to operate its cars in the Town of Lauzon upholding the contract in one sense, but ignoring it in regard to a clause in the contract covering force majeure and strikes, by which the company is exempt from operation.

The company was unable to obey this order, as the employees refused to operate the cars in the limits of the Town of Lauzon, so the situation remained unchanged in spite of the order from the commission. The company being unable to pay the increased wages the employees refused to operate in Lauzon and also advised the company that should it obtain men to operate the cars in the town of Lauzon there would be a strike on the rest of the system.

New Appeal to Commission

On June 8 the town of Lauzon again asked the commission to force the company to find money to pay the increased wages, so that the cars would operate. Judgment was rendered on June 9. In the case of Lauzon the commission refused to entertain the motion or force the company to run its cars by borrowing money, and it would not entertain any further motions of the town of Lauzon with the object of forcing the company to run under the conditions that existed. Further the commission would not accept any motion on the subject until all four municipalities agreed to revise the franchises or submit the matter to the Public Service Commission.

With regard to the city of Levis and Bienville, the commission stated that as the other two municipalities would not apply to the commission for investigation and decision the commis-

sion was unable to give any definite decision in regards to Levis and Bienville. Had, however, the other two municipalities shown their good faith and submitted the matter to the commision the commission would have issued a judgment. Therefore, until all four municipalities agree to go before the commission, the commission could not give any decision in regards to the fares, etc.

On June 10 all the employees went out on strike. The Mayor of Levis, on behalf of Levis and Bienville, met the company, and guaranteed to readjust the passenger fares to enable the company to pay its employees increased wages. The employees started operations again on June 11 in Levis and Bienville only. The city of Levis arranged to grant the following tariff: Cash fare to remain at 10 cents; regular tickets, four for 30 cents or fifty for $3.50; school tickets, at the rate of fifty for $2; children's ticket, ten for 25 cents.

Denver Cars Tied Up

Men Walk Out in Violation of Court Order — Rioters Wreck Cars — Two Persons Killed, Many Hurt

Service on the lines of the Denver (Col.) Tramway was completely suspended at 5 a.m. on Sunday, Aug. 1, through a strike of the members of the local branch of the Amalgamated Association. This action was taken by the union in the effort to enforce its demands for an increase in the wage scale of trainmen to a minimum of 70 and a maximum of 75 cents an hour, with corresponding increases for the employees in the other departments. A new working agreement was also asked for. As demanded by the union the proposed contract is to be patterned along the lines of the agreement which expired by limitation on June 1, but with the elimination of certain clauses objectionable to the men and the inclusion of additional provisions relative to working conditions.

SERIOUS rioting broke out on Aug. 5 between the strikers and their sympathizers and strike-breakers employed by the company. Two men were killed in the fighting and thirty-five others, including the chief of police and a dozen patrolmen, were wounded. Five electric cars were wrecked and the plant of the Denver *Post* was damaged by the crowd. Early in the day fighting became general and continued for hours in various parts of the city. It was announced that troops would be rushed from Fort Logan to take possession of the city and to restore order.

Union Control Demanded

In addition to asking for higher pay, the strikers presented the following demands:

No employee to be discharged by the company until approved by the union.

No person who is eligible for membership in the union to be put to work until he has secured a working card from the union.

The company to suspend union members who do not pay all union dues and fines.

No motorman who makes a coasting record of 25 per cent or better to be censured by the company.

Union members who have been in continuous service for one year or more to receive fourteen days' vacation each year with full pay, payable in advance.

No member of the union to be listed in the superannuated class until it has been proven to the satisfaction of the union that he is not able to do a day's work.

Numerous meetings between the company and union representatives during the past week resulted in a deadlock, as the employees insisted upon a provision in the agreement that the higher wage question be arbitrated after Oct. 15 and that it be made retroactive to July 1, 1920. While not adverse to the principles of arbitration, General Manager Hild very flatly and finally refused to agree to any arbitration which did not take into consideration the company's ability to pay, and further stated that under no circumstances would the company agree to any wage settlement on a retroactive basis.

Under the present wage scales the payrolls of the company show that the trainmen who are willing to work twenty-six days a month are earning from $150 to $200 a month. The company therefore considers that the trainmen are now receiving an adequate wage and feels that if there is to be any increase in fare a good portion of the additional revenues derived from such increase should be expended in the interest of the public for bettering service. With this stand the company firmly believes the public is in hearty accord.

Company Suggests Compromise

Three proposals were made by Mr. Hild which the union representatives declined even to consider. These provided for:

A reasonable and simple bonus system under which the trainmen, through savings in operating costs, would be able to earn increased compensation of 2½ cents an hour, provided a 7-cent fare be authorized by the rate-regulating authority.

A co-operative plan for settling and determining industrial relations with full participation by the union and formed along the lines of the National War Labor Board.

Arbitration by the Colorado Industrial Commission of any questions or disputes which may arise and which cannot be settled by the company and the association. Such arbitration to take full cognizance of all related facts, including the right of the public to "good, adequate and convenient service," the right of the employees to just compensation and good working conditions, and the right of the company's investors to a secure and reasonable return upon their investment as represented by the fair value of the property.

The company's position, which has been sustained on two recent occasions by the Colorado Industrial Commission, is that the revenues from the present 6-cent fare are inadequate to pay the present wage scales, which were awarded by an arbitration board on March 18, 1920, and that wages higher than the present 58-cent scale would therefore require a fare in excess of 7 cents.

Anticipating that radical action might be taken by the union the company had previously made all preparations which the short time interval permitted. The public was assured that the cars would be operated and normal service resumed as soon as it is humanly possible to do so.

Notice was served on the union officials by the city authorities that the full police and military power of the city would be used to protect the men employed by the company to maintain service, and also to protect the public against any acts of violence which might be attempted or perpetrated. The city authorities also announced that they would proceed against the union, basing their action upon the order of District Judge Whitford in which the men were forbidden to strike.

Opposes Akron Grant

Councilman Files Suit to Restrain Company from Collecting Straight Five-Cent Fare in City

Gus Kasch, the only member of the Akron (Ohio) Council who did not vote for an increase of fare for the city lines of the Northern Ohio Traction & Light Company, applied to Judge H. C. Spicer of the Common Pleas Court on July 29 for an injunction to restrain the company from collecting a straight 5-cent fare and, further, to restrain it from refusing to sell six tickets for 25 cents or twenty-five tickets for $1. Judge Spicer directed that notice of the application be given the company officials.

The petition alleges that in collecting a flat rate of 5 cents the company is violating the contract entered into with the city in 1889 and that the action of the Council in granting it the right to collect this rate of fare is invalid because no consideration is named whereby the company is obligated to do anything for the city in return for the increased fare. It is also alleged that under the charter, which has been in force since Jan. 1, 1920, no ordinance affecting the rates to be charged by public service corporations can be enacted as an emergency measure, all such ordinances being subject to a referendum vote.

Should an injunction be granted, the only result would be to force the City Council to re-enact the ordinance in the regular way. This would require three separate readings and then it could not go into effect for thirty days and would be subject to a referendum should a sufficient number of voters sign petitions requesting its submission.

Mr. Kasch filed the suit in behalf of himself and as a member of the Car Riders' League. It is reported that this organization adopted a resolution instructing him to take action in the matter.

New Orleans Men Return

Service Restored After Tieup Lasting Three Weeks—Arbitrators to Pass on Wages and Fares

Twenty-three days after they had gone on strike, demanding higher pay and union recognition, the carmen employed by the New Orleans Railway & Light Company, New Orleans, La., voted to return to work pending settlement of the questions at issue by a board of arbitration. Service was resumed on July 25 and 26, ending the longest strike in the city's history. It is announced that if the men are awarded a pay increase the fares must be raised. A 7-cent fare is considered insufficient to meet the company's needs, and a fare of 8 or even 9 cents is a probability.

INTERVENTION by Mayor Behrman played an important part in bringing the tieup of the city's transportation system to an end. On July 20 the Mayor filed in the Federal District Court a petition asking permission of Judge Rufus E. Foster for the city to inject itself into the receivership proceedings. The judge was also asked to consent to a modification of the court order in which J. D. O'Keefe, receiver of the railway, was forbidden to contract with the men through the Amalgamated Association of Street & Electric Railway Employees. To the concession asked by the Mayor, Judge Foster consented.

Terms of Agreement

The agreement reached by the Mayor, Receiver O'Keefe and James Rodgers, representing the carmen, provided that three arbitrators should be selected by them, acceptable to the federal court, who should investigate the various questions pertaining to the controversy and report their findings to the court, subject to its approval or disapproval.

The carmen were to return to work at once, at the same wage rate and under the same working conditions that obtained before the strike. It was understood that if an increase in wages was allowed the carmen the increase should be retroactive to the time the men resumed work.

No reference was made to the Amalgamated Association, whose recognition was the bone of contention between the railway and the men, although the hope was expressed by the representatives of the carmen that the arbitrators would recommend that the Amalgamated Association be recognized by the receiver. The report was to be submitted within three weeks.

Arbitrators Begin Work

The informal committee, composed of Mayor Behrman, Receiver O'Keefe and Mr. Rodgers, lost no time in selecting the board of arbitration. The board, as approved by Judge Foster, consists of Charles J. Theard, George H. Terriberry and J. P. O'Leary. Besides fixing carmen's wages the arbitrators are to determine to what extent, if any, fares must be increased. The matters to be determined by them were outlined as follows:

1. The capital charges properly to be earned by the utility under existing conditions.
2. The terms and conditions under which labor should work and the return therefor which the labor should receive under existing conditions.
3. The fare necessary for the company to receive in order to meet the just charges upon capital, labor and management.
4. A program whereby the utility might be assured the fare, labor and capital their return, and the progress of the utility through receivership and into the hands of the competent owners be expedited.

When this report is rendered the attorneys of the parties at interest will appear in court for argument and presentation of testimony and argument upon any issue remaining.

When and if the report is approved by Judge Foster, the parties at interest, in their several capacities, are to perform their respective functions as promptly as possible.

Asked $150 a Month

In their original demands the men asked a wage of at least $150 a month for platform men, an eight-hour day and a six-day week. They struck after refusing an appeal of commercial bodies and labor organizations that they remain at work until the pending difficulties could be looked into and measures of relief put forward by the city's business men.

Jersey's Problems Analyzed

Expert for Cities Addresses Governor Edwards on State's Electric Railway Needs—Situation Grave

Delos F. Wilcox has laid before Governor Edwards of New Jersey a review of local transportation issues in that state. Dr. Wilcox was the chief expert for the New Jersey State League of Municipalities in its original fight before the Board of Public Utility Commissioners against the 7-cent fare on the Public Service Railway lines two years ago. Again last year he represented the Associated Municipalities in the zone-fare case, which finally developed into the valuation and rate proceeding still pending before the commission.

The memorandum covers eighty-three mimeographed pages. Dr. Wilcox takes up in four separate sections: (1) the Public Service Railway's attack on the jitneys; (2) the present crisis in public control over public services; (3) the results of conflicting theories of valuation, and (4) the need for a definite and constructive State policy.

Dr. Wilcox says that regulation should be effective before monopoly is granted. Local transportation service should be developed in an orderly and economical way. Jitneys ought not to be permitted to destroy the electric railway when they are unable to take its place. Common carrier service by motor buses should be developed as an auxiliary to the street car, not as a competitor to it. Nevertheless, says Dr. Wilcox, a private monopoly upon which a great community is dependent for an essential public service, when such a monopoly has manoeuvered itself into a position where it cannot be effectively regulated is intolerable.

In conclusion Dr. Wilcox says that the big things upon which definite light is needed include (1) the whole matter of jitney service in its relations to trolley traffic, trolley revenue and trolley fares; (2) the ability of the Public Service Railway to render adequate service without the help of the jitneys; (3) the value of the railway company's property devoted to public use; (4) the rate of return which the railway company should be allowed to earn on its property; (5) the extent to which the cost of railway service could be reduced by improved operating methods; and (6) the extent to which public co-operation is possible and necessary in reducing the cost of transportation service.

Urges Salary Increases for Engineers

The Engineering Council recently addressed a letter on classification and compensation of engineers to State governors, mayors of the leading cities, directing heads of Federal bureaus having jurisdiction over engineering work, and civil service commissioners. Engineering heads under these various officials were also addressed. The letter first calls attention to the serious hardship to all branches of the engineering profession during the past three years, from the great decrease in the buying power of the dollar. It then gives the Council's standard classification of grading for engineering service, with a tentative schedule of standard rates of compensation in each of the proposed grades. This list follows:

Adopted Grades	(Tentative) Compensation Schedule
Junior Aid	$1,080 to $1,560
Aid	$1,680 to $2,400
Senior aid	$2,520 to $3,240
Junior assistant engineer	$1,620 to $2,580
Assistant engineer	$2,700 to $4,140
Senior assistant engineer	$4,320 to $5,760
Engineer	$5,940 and upward
Chief engineer	$8,100 and upward

In conclusion, the letter solicits the views of the recipient as to the feasibility of adopting Engineering Council's schedule of grading and compensation and offers to furnish any information desired on special problems.

Sixty Cents for Albany Men

Employees of the Albany and Troy divisions of the United Traction Company, Albany, N. Y., have accepted the company's offer of an increase in pay of 15 cents an hour and a four months' contract from July 1, 1920. The acceptance of the offer ends a series of conferences that had been under way for a month and does away with the possibility of a strike. The men were receiving 41 and 45 cents an hour; under the new scale they will receive from July 1 56 and 60 cents an hour.

City's Appeal Wins

Circuit Court of Appeals Holds Toledo Vote Legal, Overuling Judge Killits—Issue to People

The people of Toledo may yet have the opportunity to vote on the $7,000,000 bond ordinances to provide a municipal transportation system. Prosecuting Attorney Allen Seney, on behalf of the election board, filed an eleventh hour appeal with the Circuit Court of Appeals for the sixth federal circuit at Grand Rapids, Mich., and that body heard arguments on Tuesday and Wednesday of this week. The court thereupon suspended the injunction barring the referendum, holding the restraining order to be illegal under the city charter. In the ordinary practice the case would have gone to Cincinnati to be heard there by the same court but there would have been such delay that the election of Aug. 10 would have been impossible.

AFTER Judge Killits issued his order restraining the board of elections at Toledo from permitting the bond ordinances to be placed on the ballot, the members of the municipal ownership commission and the city authorities declared that they would not ask any appeal but rather would lend their efforts to perfecting the ordinances by repassage in accordance with the city charter and in time for the November election.

Forces Court Action

The prosecuting attorney took matters into his own hands and forced a fight before the higher court. He fought the order on the grounds of lack of jurisdiction, arguing that Judge Killits did not have the right to interfere with a political action.

Granting that the ordinances are illegal, Mr. Seney declared that the Toledo Traction, Light & Power Company, a holding company, could not sue because it has another legal remedy and the present issue is too remote. Mr. Seney stated the city's side of the case as follows:

> The merits of the municipal ownership or service-at-cost plans of settlement of the traction issue are not at issue. That makes no difference now. The principle at issue is whether a federal court can enjoin the city from holding an election. That is more important than whether I walk or ride, and street cars are a necessity to me.

The court decided it would hear the case on Mr. Seney's request and a bond of $300 was filed by the prosecuting attorney. The traction company interests are represented by George D. Welles, who argued the case before Judge Killits. He has introduced several new angles into the dispute.

In his motion for dismissal of the appeal, Mr. Welles declared that voting in Toledo is in progress under the "absent voters'" law, and that many have already been deprived of right to vote on the bond ordinances, so that there can be no complete expression of the will of the voters of Toledo.

Technical Errors Alleged

He also alleged that the city clerk failed to send each voter a copy of the ordinances as is required by the charter; that the bond issue ballots ordered by the election board had been destroyed by the printer, and that new ballots can be printed only after ten days' advertising for bids, which would throw the matter beyond Aug. 10. He also put in an argument to the effect that a better municipal ownership ordinance would result if the voters were to wait till the November elections or until some still later date.

It is doubtful whether the twin ordinances would be adopted if they came to a vote on Aug. 10. The municipal ownership campaign has gone forward since the injunction appeal was taken to the higher court, but the commotion raised at the hearing before Judge Killits has almost crushed the chances of the municipal ownership plan.

No concerted campaign has been carried on in behalf of the cost-of-service plan since it was ratified by Mr. Doherty. As soon as the measure receives the approval of the City Council, which is practically guaranteed by the terms of the ordinance under which the cars were brought back from Michigan last fall, the combined strength of four business men's clubs and the Chamber of Commerce will be thrown into the campaign.

Providence Considers Jitney Regulation

At a recent meeting of the ordinance committee of the City Council of Providence, R. I., it was voted unanimously that there would be no public hearing on the jitney problem. According to Chairman William Hughes, the members feel they can best get at the heart of the matter by calling, individually, representatives of the jitney men and the Rhode Island Company. The committee, it was said, will not start drawing up regulative legislation for jitneys until both sides have had an ample opportunity to explain their stands.

A petition, signed by officers of the banks, trust companies and savings institutions in the city asks that the electric railways be granted some relief by "enacting such ordinances as will place the jitneys and other motor vehicles operated for hire more nearly upon an equality with the railways and thus, to some extent, remove this unfair competition without depriving the public of whatever benefit a properly regulated jitney service may afford where it is necessary." The petition says:

> The loss to the electric railways through this unregulated and unfair competition is estimated by the receivers, after careful observation, at not less than $750,000 per year and is probably much more.
>
> Unless some regulation is enacted we see no hope of reorganizing the electric railway service or of keeping it in operation. The money required for reorganization cannot be obtained.
>
> We do not feel that we are justified in permitting the capital of the people for whom we are trustees to be any longer used in the public service without any return. Much less do we feel that we can call upon them to advance more capital upon which there is no prospect that they will ever receive a return.
>
> We feel that we might properly ask for a removal of the ruinous competition to which the electric railways are subjected, on the ground that it is unfair to those whose savings are invested in the railway properties which have so long served the community. But aside from these investors, we believe that the whole public is vitally interested in the preservation of the electric railway system, and that your honorable body, as the representatives of the public interests, should not permit it to be destroyed.
>
> The system of competition which may destroy the electric railways does not and cannot pretend that it will supply the public needs for transportation when once the destruction is accomplished. That it cannot do so has been the verdict of the public utility commissions throughout the country which have studied the subject.

Rapid Transit Lines for Staten Island

Several proposed methods for connecting the Borough of Richmond by tunnel with other sections of New York City were submitted to the Board of Estimate & Apportionment of the City of New York recently by Transit Construction Commissioner John H. Delaney. The report, which was prepared in response to resolutions adopted by the Board of Estimate, gives details and estimates of costs for six tunnel schemes, and for a great bridge spanning the Narrows that would have capacity for rapid transit, freight and through passenger service, as well as for vehicular traffic between Staten Island and Brooklyn.

The cost of carrying out the various schemes ranges from $6.000,000 to $100,000,000. Two of the schemes analyzed, which have been advanced by residents of Staten Island, involve a combination tunnel and viaduct along the New Jersey shore of the bay, extending from St. George, Staten Island, to the Battery in Manhattan.

A Kind Word for the Manager

The Roanoke *Times* recently contained an editorial "The Street Car Service," reproduced substantially in full:

> It is quite the custom here, as in other American cities, to growl about the street car service. It is a typically American habit and doesn't really mean anything. The street car company, the ice company and the local newspapers are looked upon as fair game and it doesn't do at all to take seriously everything said about them.
>
> More or less extended observation has convinced us that the street car service here compares favorably from many standpoints with that of a number of other places. The schedule is all that could reasonably be asked, the rolling stock is in good condition, the employees are courteous and obliging—and the fare is only 5 cents. Aside from a street car ride, what can be named offhand that sells today for exactly the same price it brought before the war?
>
> Roanoke people, who go away from home and submit without grumbling to the higher prices charged elsewhere, rarely have a good word to say for the local service. It might be better in some respects, of course. But it averages up pretty well as compared to other places and most of the "knocking" is unjustified. Manager Hancock is thoroughly reasonable and approachable, and a legitimate kick is always sure of attentive consideration, something that cannot be said everywhere.

Nation Stands to Lose

Mr. Porter Says Financing of Public Utilities Is Country's Biggest Job —Appeals for Square Deal

H. H. Porter, vice-president and general manager of the Brooklyn City Railroad, in a recent statement to the press of New York, attributes the present plight of the traction companies basically to war's dislocation of industry; abnormal increase in wages and in cost of all materials, including coal; the heavy burden of direct taxation, as well as indirect taxation costs, embracing paving systems, etc.; the necessity of giving longer rides and more transfers, without additional compensation; operation of non-paying extensions and employment of improved facilities, coupled in many instances with decreased riding, due both to jitneys and private competition of automobiles.

FINANCING GREATEST PROBLEM

Mr. Porter illustrated the unfavorable situation by stating that a total of about 7,000 miles of track, representing almost 16 per cent of the entire track mileage of the electric railways of the country, was in the hands of receivers or had been abandoned or junked. He sees signs of a more encouraging viewpoint in the regulatory authority, and cites particularly the attitude of the State of California as expressed by Edwin O. Edgerton, president of the Railroad Commission. Mr. Edgerton declares that the greatest single problem faced by both California and the nation is the job of financing public utility enterprises. California alone, it is estimated, will need at least $50,000,000 for this purpose in the next decade. These figures are quoted by Mr. Porter to indicate the huge sums which must be devoted to the similar tasks which confront New York.

Mr. Edgerton stressed the need of recognizing the human factor. He insisted that punishment was not the way to promote efficiency in public utility corporations any more than in men and women. He urged California to apply that principle "to the fellow who has money to invest," recognizing, he said, that "we cannot get money out here from the East into California by threat, by argument, by any form of punishment, by any suggestion that because of investment already made they cannot quit. I recognize that the money must come by inducement and, in my judgment, it can be induced without paying exorbitant and unreasonable prices for it."

INCENTIVE OF REWARD IMPORTANT

Mr. Edgerton holds that having begun to take care of the investor and having produced a situation where his investment is safe and intact, his return regular and sure, then the organization of the company itself should be stimulated by offer of reward.

This general statement, according to Mr. Porter, is applicable to the transportation situation in New York and Brooklyn. Thus the Brooklyn City Railroad is largely a Brooklyn enterprise, a great number of its shareholders being Brooklyn men and women. Of a total stock list of 1,472 holders, representing 1,200,000 shares of the par value of $12,000,000, 391,951 shares of a par value of $3,919,510 are held by 742 women. Trustees, administrators, executors, guardians, life insurance companies, charitable institutions and colleges numbered 208 holders and held 407,799 shares of a par value of $4,077,990. Other corporations, individuals and others, to the number of 522, hold 394,250 shares of a par value of $3,942,500.

Mr. Porter cited these figures to show the character and diversity of the interests which must be protected under any equitable plan of readjustment.

Holland Commission Arrives to Study American Electrification Conditions

A commission made up of railway experts to study American methods of electrification has been sent by the Government of the Netherlands to this country. The party is headed by L. M. Barnet Lyon, member of the Board of Control of the Netherlands Railways. J. J. W. Van Loenen Martinet is secretary of the commission. Other members of the party are H. J. Van Lessen, H. Doyer and W. J. Burgersdijk, the latter being manager of the Holland Interurban Railway. The first government line in Holland to be equipped will be that between Amsterdam and Rotterdam, a distance of about fifty-five miles. Other electrifications will follow. A superpower system is also proposed. The equipment will be largely multiple-unit, though locomotive operation will also be required.

The commission will make a thorough study of American electrifications and will remain in this country for some two months. Visits have previously been made to Sweden and Switzerland to inspect the electric lines.

Appeal from Paving Order Sustained

The Public Utilities Commission of Maine has ruled upon the appeal of the Cumberland County Power & Light Company from the order of the municipal officers of Portland in relation to paving and resurfacing certain sections of certain streets and relocating tracks of the Portland Railroad, which it operates under lease. The appeal is sustained, the decision being signed by all three commissioners.

There are certain points, such as the percentage of cost of work, upon which the company and the city must come to an agreement. The commission holds the case open until such agreement is reached and the commission further orders that a report of such agreement be made to the body. When all the evidence has been submitted in this case, together with the arguments of counsel, the commission will determine the questions raised by the appeal and apportion the expenses involved in the matter submitted.

Freight Rates Advanced

Electric Railways Enjoy the Same Advance as Steam Roads Under I. C. C. Decision

In its opinion authorizing increased railroad rates, made public Aug. 1, the Interstate Commerce Commission has the following to say with regard to freight rates on electric lines:

Petitions have been filed in this proceeding by a national organization of electric lines, seeking permission to increase their rates in the same proportion as the rates of trunk lines are advanced. The operating costs of these lines have, on the whole, increased in approximately the same ratio as those of steam railroads. In some instances there is competition between the electric lines and the steam railroads. We conclude that the freight rates of electric lines may be increased by the same percentages as are approved herein for trunk lines in the same territory. This is not to be construed as an expression of disapproval of increases, made or proposed in the regular manner, in the passenger fares of electric lines.

Athletic Park for Rail Workers

"Tramway Park," the new athletic field provided and equipped by the Kansas City (Mo.) Railways for its employees, was opened recently with a game between the "Tramways" and another team in the Inter-City League of Greater Kansas City. Although the grounds were intended primarily for the use of employees, indications point to the park, becoming an important factor in the stimulation of athletics in the city. A factor particularly helpful to the success of the park is *The Railway Athlete*, the weekly paper of sports published and financed by railway employees. The scores and reports of games in the semi-pro leagues are published by *The Railway Athlete*. It is becoming the official organ of amateur baseball; and is building a large circulation among employees of business institutions which have ball teams in the local leagues. The availability of Tramway Park, where games may be played with convenient arrangements for charging admission, offers opportunity for many more games to be scheduled than could be done before.

Philadelphia Chamber on Labor

With the purpose of protecting the public from industrial warfare, an industrial relations committee has been established by the Chamber of Commerce of Philadelphia. It declares for the open shop, for the recognition by employer and employee of their full responsibility and for the faithful performance by them of the agreements or contracts into which they enter. It calls for the highest efficiency and production in industry consistent with the health and welfare of workers, and opportunity for the worker to develop his fullest earning capacity and command his maximum wage. These and other principles are summed up in eleven paragraphs, of which the one relating to utility operation follows:

The paramount interest of the public in the operation of the agencies of transportation and other branches of public utility service must be asserted and maintained against any attempt to bring about an interruption in the service of any public utility in furtherance of any private purpose or interest.

Bus Plan Attacked

Chamber of Commerce Condemns New York Bus Scheme—Analyzes City's Transit Situation

A proposed solution of the transportation difficulties of New York City is contained in a report of the transit committee of the Brooklyn Chamber of Commerce, presented at a public hearing of the Board of Estimate of New York City on July 28. This report declares that while the motor bus has recently proved its worth in urban transportation sufficiently to justify the conclusion that it is here to stay, its usefulness will not be found as a separate and independent system but rather as a feeder to existing trolley and rapid transit lines. The experience in various cities in this country and particularly abroad is quoted to justify this position.

The establishment of an independent bus system in New York, operated by the city or by private corporations, it is said, would mean a revival of the old principle of competition as a means of regulating this public utility service, a principle which was discarded years ago, when public utilities were made subject to State regulations. Such a competitive enterprise, in the opinion of the committee, would only tend further to disorganize the transportation service and result in added discomfort and inconvenience to the traveling public.

It is also pointed out that if the recent New York municipal bus lines had not taken only the cream of the service they would have been unable to operate on a 5-cent fare.

$50,000,000 NEEDED

The report estimates the cost of installing a comprehensive bus system in New York and estimates that to do the work of the present surface cars it should consist of from 5,000 to 6,000 buses at $8,000 apiece, which, with shops, garages, etc., would mean an initial investment of from $50,000,000 to $60,000,000. This system, it says, would naturally compete with the $250,000,000 investment which the city now has in the present subway systems. Finally, the buses would add greatly to the street congestion, which is one of the tasks before the city to reduce. In commenting on the need for a settlement of the New York transit situation, the report says in part:

> Neither party to the contract under which our transit systems are operated has yet given evidence of that spirit which is so essential to a just and equitable settlement of our transit difficulties. The companies merely ask for an increase in fare. The city administration in reply proposes municipal ownership and operation of existing lines or the establishment of city owned and operated bus lines. The companies, obligated under their contracts to give service at a 5-cent fare, ask the city to surrender this advantage without evincing any willingness to surrender to the city any of the advantages which they secured under their franchises and contracts. The city, on the other hand, tries to ignore the partnership relation existing between the companies and the city and is apparently seeking a complete disintegration of the service.
>
> The Brooklyn Chamber of Commerce for a year and a half has been urging the companies to consent (1) to the abandonment of the preferentials granted in existing contracts, (2) to the elimination of the outstanding perpetual franchises, (3) to the abolition of the numerous holding companies and the endless maze of subsidiary companies, and to a proper readjustment of their capitalization, in exchange for a fair consideration of their financial needs; but in all of the communications issued by the officials of the companies or the receivers appointed by the courts calling the attention of the public to the seriousness of their financial condition and the dire need of financial relief, there has not been a single hint or suggestion that the companies are willing to meet the public half way and, in return for concessions which they ask the city to make, to surrender any of the unfair advantages which the public believes the companies secured when they drove a hard bargain in the framing of the original contracts and franchises.
>
> #### CITY FAILS TO CO-OPERATE
>
> On the other hand, the uncompromising and hostile attitude of the city administration toward the companies gives the public no more encouragement for an early and constructive solution of the problem than does the unyielding attitude of the companies. When the companies appear before the Board of Estimate and Apportionment to present and defend their case they are not met with open-minded consideration. No constructive plan can be developed in such an atmosphere of hostility and suspicion. The city administration might find justification for its present attitude if it were intended as a preliminary to securing an advantageous position in negotiating a constructive plan of readjustment; but this hostile attitude has been maintained so long that the public has come to believe that the administration has no constructive plan, but that its policy is one of more obstruction, which, of course, leads nowhere.
>
> If the Mayor is seeking a constructive solution of the transit problem in the interest of the public and if the companies are really desirous of arriving at a working agreement with the city and the public there is nothing to hinder the simple but customary procedure of the parties to the agreement meeting about the conference table, adopting the policy of absolute frankness and fair dealing, laying all their cards on the table, face up, and each evincing a willingness to make concessions in the interest of the larger public which they both serve.
>
> If the Mayor and the board will give their attention to this simple and fair method of procedure they will move much more rapidly toward a solution of the transit problem than they will by suggesting and discussing a city-wide bus system, which would result only in freezing out or starving to death the existing transit companies—a result disastrous not only to the stockholders but to the entire traveling public, which is so fully dependent upon existing transit facilities.

News Notes

Wage Offer Rejected.—Platform men in the employ of the Berkshire Street Railway, Pittsfield, Mass., have rejected the offer of a 15 per cent flat increase made by General Manager C. Q. Richmond of the company in answer to the union's request for a 40 per cent increase. The union voted to hold out for the full 40 per cent increase.

More Pay for Oklahoma Men.—The Oklahoma Railway, Oklahoma City, Okla., has increased the wages of its platform men 3 cents an hour. The pay award is retroactive to June 1. The company has announced that it will grant a further increase of 3 cents an hour to take effect on Oct. 1. The company has an application pending for an increase in fare from 5 cents to 7 cents before the City Commission.

Dayton Arbitrators Named.—Thomas Elliot, consulting engineer of the Cincinnati Traction Company, has been selected by the electric railways operating in Dayton, Ohio, as their representative on the board of arbitration which is to determine a permanent wage plan for the Dayton carmen. J. Ernest Duncan will represent the men. It is proposed to consolidate the several local unions.

Men Reject Winnipeg Award.—Carmen in the employ of the Winnipeg (Man.) Electric Railway on July 19 voted by a small majority to reject the 10 per cent wage increase awarded them by the Myers board of arbitration. The company had previously announced that it would accept the findings of the board, although they would entail an additional expense of $300,000 annually. The men demanded an increase amounting to practically 50 per cent. It was proposed to take a second vote later on the question of calling a strike to enforce these demands. At a hearing before the Manitoba Public Utilities Commission on July 20 counsel for the shareholders of the company appealed for an 8-cent fare on the Winnipeg lines.

Citizens Plan Des Moines Campaign.—Citizens' organizations plan to take an active part in settling the traction difficulties of Des Moines, Iowa. Tentative plans have been made to call a meeting of all the presidents and secretaries of local improvement leagues to form a city-wide organization to intervene in the controversy between the city and the Des Moines City Railway. It is proposed to seek the co-operation of all commercial and civic organizations so that the new federation will be entirely representative. O. M. Brockett, legal adviser for the Des Moines Chamber of Commerce, who was chairman of the franchise committee of the citizens' general committee which last year sought to work out the Des Moines railway problem, has written a letter to Mayor Barton proposing a service-at-cost basis.

Safety First With a Vengeance.—The Japanese equivalent to "ca 'canny," says the *Electrical Railway & Tramway Journal*, London, was exemplified in a recent strike on the Tokio tramways, where the employees on that system brought a "Go slow" strike to a successful conclusion in one day. Their method, states the *Globe*, was to discover defects in the mechanism of the cars and then run them into the depots for repairs. As the cars are not exactly new, there are few of them on which this game cannot be successfully worked. But after being conceded an increase in wages, the men who had declined to break the regulations by driving unsafe cars were soon rattling them over the streets at the old break-neck speed. The municipality surrendered in the afternoon. The men were conceded a minimum wage of 5d. an hour, with an eight-hour working day, a bonus of six weeks' wages twice yearly, and pensions at the end of service.

Financial and Corporate

Revenue Increases $250,000

$42,000 Deficit of Utah Light & Traction Company Changed to Profit of $29,350

After paying all interest charges, including $801,000 bond interest, and after placing $150,000 in its depreciation fund, the Utah Light & Traction Company had profits for the year ended Dec. 31, 1919, of $29,355. This compares with a net loss to the company for the previous year of $41,868 and makes an increase of 170 per cent.

The total railway operating revenue for 1919 was $1,855,281, as compared with $1,602,000 in 1918. This was an increase of $253,281, or 15.8 per cent. On the other hand, the operating expenses increased only $130,000, being practically $1,138,000 in 1919. The net revenue from operations was about $718,000, or an increase of approximately $123,000 over 1918. Due to a reduction of $37,000 in the income tax paid, the amount of taxes paid in 1919 decreased $28,000 over 1918. For 1919 the operating income increased to $609,529. This was an increase over 1918 of $150,422, or about 38 per cent.

Non-operating income was made up chiefly from the Utah Power & Light Company for the rental of power plants. The gross income was $992,517 for 1919. In comparison with 1918, this was an increase of $168,973, or 20.5 per cent. From this gross income, interests on bonds of $801,000, depreciation of $150,000 and other interests of $12,000 were deducted, leaving the net profit at $29,355, or an increase of $71,000 over 1918.

The traction company has 92.1 miles of main line track, of which 71.11 miles are in Salt Lake City, and 52.70 miles of second track, of which 49.05 miles are in the city. Of the total operating revenue given $1,820,000 is in passenger revenue and about $20,000 in freight revenue. Passenger conductors and motormen were paid $466,000 during the year of 1919, or $43,000 more than in 1918. In spite of heavier traffic, the power bill decreased $4,000, due to the skip-stop system and less frequent schedules on some lines.

TRAFFIC INCREASING

The total number of revenue passengers carried during 1919 was 33,908,484, of whom some 5,500,000 used transfers. The total passengers carried increased 3,346,520, or 9.3 per cent over 1918. Each passenger paid an average fare of 5.37 cents. The revenue per car-mile was 35 cents, while the expenses per car-mile were 23.5 cents. Operating revenue per car-hour was $3.53, and the operating expenses per car-hour were $2.57. The operating ratio decreased from 71.3 per cent in 1918 to 67.2 per cent in 1919.

INCOME STATEMENT—UTAH LIGHT & TRACTION COMPANY

Year Ended Dec. 31:	1919	1918	Percentage Change Over 1918
Total railway operating revenue	$1,855,281	$1,602,000	15.8
Total railway operating expenses, including taxes	1,245,752	1,142,893	9.0
Operating income	$609,529	$459,107	37.7
Non-operating income	382,988	364,437	5.1
Gross income	$992,517	$823,544	20.5
Deductions from gross income:			
Interest on bonds	$800,869	$786,317	1.9
Other interest and deductions	12,293	54,095	—77.4
Depreciation	150,000	25,000	500.0
Total deductions from gross income	$963,162	$865,412	11.3
Net income transferred to profit and loss	$29,355	$41,868*	+170.0

* Deficit.

STATISTICAL INFORMATION—UTAH LIGHT & TRACTION COMPANY

Year Ended Dec. 31:	1919	1918	Percentage Change
Miles of single track	146	146	.....
Car hours	5,303,783	5,466,576	—3.0
Car house	525,216	544,084	—3.4
Ratio C.M. to C.H. (speed m.p.h.)	10.09	10.02	0.7
Total passengers carried	39,521,505	36,174,985	9.3
Average number of cars operated	80	83	3.6
Statistics per car-mile:			
Operating revenue (cents)	35.0	29.4	19.0
Operating expenses (cents)	23.5	20.9	12.4
Net income (cents)	0.55	0.77	—28.6
Number of passengers	7.45	6.62	12.5
Car-miles per passenger carried	0.134	0.151	—11.3
Statistics per car-hour:			
Operating revenue	$3.53	$2.95	19.6
Operating expenses	$2.57	$2.10	22.4
Net income (cents)	5.6	7.7	—27.3
Number of passengers	75.3	66.4	13.4
Operating ratio, per cent	67.2	71.3	—5.6

Railway Properties Run at Loss

The Northern Ohio Traction & Light Company, Akron, Ohio, has issued income statements for its railway lines in Canton, Massillon and Akron. All three lines have large deficits after providing for depreciation of property, and allowing for a return of 10 per cent per annum on an estimated investment. The lines in Canton, however, were operated at a small profit, if the allowances for depreciation and for a return on the investment in the property are disregarded.

$47,035,000 St. Louis Value

Commission Appraises Property of United Railways—Has Used $50,000,000 as Rate Basis

The Missouri Public Service Commission made public on July 27 its audit of the United Railways of St. Louis. The valuation of the entire property of the company is fixed by the commission at $47,035,120. The appraisal of the property by engineers for the commission has not been completed, but the engineers worked in conjunction with the accountants and the valuations are expected to be about the same. The book value of the property as shown by the records of the company is $101,436,776 and the outstanding indebtedness $121,000,000.

The audit of the company's books reveals a continuous policy of pyramiding inflated values. Original values of the properties of the companies taken over in the consolidation of the various lines are shown to have been multiplied by many times their actual cost.

COMPANY'S ESTIMATES CUT

As carried on the books of the company the property is divided into two classes, namely, property purchased from original companies and new construction and equipment. The company's books carry purchased property at a value of $83,740,813 and that of new construction and equipment at $17,695,963, making the total of $101,436,776. The company's figures for new construction and equipment were accepted at almost face value, but the total value of original property purchased was cut from $83,740,813 to $30,939,847, a reduction of approximately $53,000,000.

The items which were deducted from the valuation by the commission consisted principally of franchise values, promotion expense, commissions and other items which do not represent physical property. In many instances these items amounted to from 50 to 75 per cent of the original book value of separate lines.

Pending the results of the valuation the Public Service Commission has been using a tentative value on the property of $50,000,000 in fixing the rate of passenger fares. The company will shortly ask a fare increase.

Shore Line Sold

Portion of Road on Which Service Was Abandoned Last Year Will Be Junked

Fifty miles of line belonging to the Shore Line Electric Railway, Norwich, Conn., have been sold to the United States Rail & Equipment Company, Memphis, Tenn. The purchaser proposes immediately to dismantle the entire line and to dispose of the material and equipment. The sale has been approved by Judge George E. Hinman of the Superior Court and papers in the transaction have been signed. The sale involved $340,,000. Practically all of the stock in the line sold is owned by the estate of the late Commodore Morton Plant.

Court Approves Sale

Robert W. Perkins, as receiver of the Shore Line, obtained an order from the Superior Court on June 15 authorizing him to dispose of the line at public or private sale, subject to approval by the court. The property to be removed comprises trackage, turnouts, sidings and materials, starting from State and Ferry Streets in New Haven and extending to Old Saybrook, Chester, Guilford, Stony Creek, Branford, Flanders Corner and East Lyme. The portion of the road sold has not been in use for about a year, operations having ceased when the employees went on strike in July, 1919. The New London division, formerly operated by the Shore Line, under lease from the Connecticut Company, was returned to the latter recently by court order, through abrogation of the lease.

A statement of assets and liabilities of the portions of the Shore Line still being operated for eight months ended May 31, 1920, filed with the clerk of the Superior Court, shows a deficit of $83,198.

By months, the deficit is made up as follows:

October, 1919	$21,851
November, 1919	3,571
December, 1919	4,405
January, 1920	9,853
February, 1920	26,346
March, 1920	12,043
April, 1920	2,693
May, 1920	2,436
	$83,198

The report of operation for the month of May shows that on the first day of the month there was cash on hand amounting to $10,511. The cash receipts for the month were $53,540. Cash disbursements for the month of May were $47,812, leaving a cash balance on June 1 of $5,728. Total cash on hand at that time amounted to $16,239.

Suburban Line Improves

Advance in Zone Fare and Addition of Zone Increases Net, but Do Not Permit Dividends

The annual report for the year ended Dec. 31, 1919, of the New Bedford & Onset Street Railway, New Bedford, Mass., indicates that the net income increased about $10,000 over the previous year. This is due largely to the recent increases in the zone fares. The first advance was in August, 1918, when the rate per zone was increased from 6 cents to 7 cents and reduced rate tickets which were sold at 14.3 per cent discount were made universally valid instead of being accepted only on certain portions of the line. The second increase was made on Feb. 11, 1919, when the unit zone fares were increased from 7 cents to 8 cents. Ticket rates were increased also 1 cent per zone. The change in fares apparently produced a 26 per cent increase in passenger revenues and a 2.5 per cent increase in the number of revenue zone passengers carried, due not to an increase in traffic, but to the increase in the number of fare zones on the line. In reality, the traffic fell off during the year, and the number of car miles operated decreased 9.75 per cent.

The above table shows in detail the income and traffic handled during the past year as compared to the year 1918.

STATISTICAL INFORMATION, NEW BEDFORD AND ONSET STREET RAILWAY

Year Ended Dec. 31	1919	1918	Per Cent Change + Inc. — Dec.
Mileage—first main track (miles of line)	37.59	37.59	.....
Total—all track	44.00	44.00	.....
Average total miles operated	40.00	40.00	.....
Revenue zone passengers	1,922,502	1,875,718	+ 2.50
Revenue car miles	(a) 430,642	(b) 492,870	(c) -11.15
Car mile statistics—			
Operating revenue * (cents)	38.85	37.40	+ 3.90
Operating expenses* (cents)	25.10	21.72	+15.60
Net income (cents)	2.68	0.295	.....
Passenger traffic	4.47	3.81	+17.40
Passenger car miles per revenue zone passenger	0.223	0.255	—12.55
Mileage statistics—			
Operating revenue per mile of line	$4,450	$3,590	+24.0
Zone passengers per mile of line	51,200	49,900	+ 2.6
Number of persons employed—Dec. 31	50	.....	.....

*Exclusive of power sold.
(a) Passenger car miles only.
(b) Passenger car miles 478,699 only.
(c) Decrease is for passenger car miles

Dallas Deficit Grows

The total deficit of the Dallas (Tex.) Railway for the thirty-three months during which the company has been operating under the present franchise now amounts to $547,223, according to the statement of operating results for June. During June the company earned $36,584, or $15,114 less than the amount necessary to yield a 7 per cent return on the agreed-on valuation of $8,862,685. The gross income for the month amounted to $254,123.

Argentine Lines Do Well

Report Net Income of $448,000 for 1919 —Expenditures 78 Per Cent of Gross Receipts

For the year ended Dec. 31, 1919, the Anglo-Argentine Tramways, Ltd., Buenos Aires, Argentina, reports a net income of $448,000 in spite of labor troubles and a great increase in operating expenses. The gross receipts were about $16,000,000. The total expenditures for the year amounted to $12,480,000, this being an increase of $962,000, or 8.35 per cent, over the working costs in 1918. Traffic expenses, in which the chief item is wages and salaries, were $4,100,000, an advance of about $500,000, or 13 9 per cent. This advance was mainly represented by increased wages of $281,500 and strike expenses of $173,250.

Building Own Cars

Under the head of maintenance, $1,342,000 was expended, principally on rolling stock, as against $1,180,000 in 1918, an increase of $162,000, or about 13.7 per cent. There are now in the service 1,684 motors and 869 trailers. In view of the delays and difficulties in obtaining deliveries of new rolling stock from Europe, cars are being constructed in the company's own workshop from native woods. General rates and taxes, at $1,513,000, showed an increase of $123,500, or 8.9 per cent, over 1918. The new capital expenditure during the year was $677,000.

The net profit for the year, $448,000, was arrived at after providing $470,000 transferred to renewal reserve, $342,000 as rent of leased lines and interest amounting to $2,680,000 on the three series of debenture stocks. Other amounts charged before arriving at the net profit were, for the redemption of preference and ordinary share capital, $33,950, and for the redemption of debenture stock, $235,500. The total stock redeemed and canceled in this way is $2,065,000 to date. The sinking fund for the redemption of the share capital is $410,000. To the year's profit of $448,000 there is to be added an undistributed balance of $402,500 from previous years, making a total profit for the year's operation of $850,500.

Traffic Receipts Increase

The redeeming feature of the year's operation was the continued and steady increase in the traffic receipts, notwithstanding an estimated loss of about $348,500 due to labor troubles. This indicates a great revival of business activity in Buenos Aires. The number of passengers reached the record total of 370,734,985, an increase of 6.14 per cent over 1918, although at the same time the car mileage increased only 1 per cent. The population of the city being 1,658,269, it follows that the inhabitants were carried 224 times over in the year.

The company has 387 miles of single track surface lines and 8½ miles of single track subways.

Financial News Notes

Rumor of Merger.—The Princeton (W. Va.) Power Company is said to have been approached with the proposition to take over from the Appalachian Power Company the electric railway system in Bluefield and make it one with the interurban and Princeton system.

Will Meet Bond Payment.—The International Railway, Buffalo, N. Y., has notified holders of its refunding and improvement 5 per cent gold mortgage bonds that on presentation to the Bankers' Trust Company, New York City, all interest coupons due May 1, 1920, will be paid together with all interest due on the bonds up July 12.

Railway Sold at Auction.—The property of the Plymouth & Sandwich Street Railway, Plymouth, Mass., was sold at public auction on July 27, to Louis Zuensky of Cambridge for $55,200. The sale included all of the real estate and personal property of the company. The sale covered 17.8 miles of track and overhead and the carhouses in Sagamore and Plymouth. Operation of the line ceased April 1, 1918, and the sale was the result of a decree of the Supreme Court. The road is expected to be junked, although there is some talk of operating a portion of the line.

Sale Halted Pending Hearing.—T. S. Riley recently appeared before Judge J. C. Pritchard, of the federal court, in behalf of the Grafton Light & Power Company, the Grafton Traction Company and the Grafton Gas & Electric Company, Grafton, W. Va., in bankruptcy. He requested an order of stay in sales of the property of the companies. An order was issued postponing the sale until the matters in the case can be heard. T. F. Lanham, trustee, was ordered to proceed no further with the sale until further order of the court.

Borrows for Jacksonville Lines.—E. J. Triay, receiver for the Jacksonville (Fla.) Traction Company, has received permission from the United States District Court to borrow $143,690 and to issue certificates of indebtedness to cover this amount. The receiver asked for the funds to meet the cost of street paving and to pay State and county taxes. The receiver in his petition showed that the income from the operation of the lines, under the present rate of fare, has continued to be less than the expenses of operation; also that it has been impossible to accumulate or set aside any amount to meet more than the current expenses.

City-Owned Line Going Into Debt.—On July 22 the board of directors of the Norton, Taunton & Attleboro Street Railway, Norton, Mass., met and discussed the report of the company. The report was complete only to May 31 and showed that the system had been conducted at a loss since the taking over of the lines by the cities of Norton, Taunton and Attleboro. The operating expenses were $42,218, while the operating revenues amounted to $35,600. There are also more than $17,000 in vouchers payable. The road was to have been abandoned because the return on the investment was inadequate. In order to retain the service the line was purchased by the cities concerned.

Allows 6 Per Cent Return.—Justice Charles E. Nichols of the State Supreme Court has rendered an opinion in the case of the Municipal Gas Company (Albany, N. Y.) vs. the State Public Service Commission, in which he holds in effect that the company may charge a sufficient rate to secure a 6 per cent profit on the capital invested, over and above the actual cost of production, "until such time as the expenses of production shall decline to where they were previous to 1918." The commission had refused to permit the company to charge more than $1 per 1,000 cu.ft., in compliance with the terms of a State law fixing the rate for gas at not more than this amount.

Utilities Bear Tax Burden.—Public utilities operating in the State of Ohio are bearing the burden of taxation in that State, according to an address made by Clarence Dalton, tax representative for the Toledo Railways & Light Company, before the Ohio Electric Light Association. Mr. Dalton pointed out that in its report for 1917 the State Tax Commission stated that "public utilities in Ohio today are paying taxes on a valuation more than 4.63 times greater than the 1910 value, and the increased amount of taxes that are paid into the counties and their subdivisions are in proportion to the increased valuation." This figure has been increased in many instances since 1917.

Trust Issue Approved.—The New Jersey Public Service Commission has approved an equipment trust agreement between the Public Service Railway, Newark, and the Osgood Bradley Car Company under which $1,820,000 of trust certificates will be issued. The certificates will bear interest at the rate of 7½ per cent a year and will be used to purchase 200 one-man safety cars, 100 center exit trailer cars, fifteen double-truck snowplows and fifteen single-truck sweepers. The commission has also approved an application by the company for permission to issue $410,000 in promissory notes to yield 7½ per cent. Of the total, $205,000 is payable in two years and the remainder in three years.

Offer Car Trust Certificates.—The Northern Ohio Traction & Light Company, Akron, Ohio, through Cassatt & Company, Philadelphia and New York, is offering for subscription $1,000,000 in 8 per cent gold certificates at 100 and interest, to yield 8 per cent. The certificates are issued under the Philadelphia plan in denominations of $1,000. The Fidelity Trust Company of Philadelphia is trustee. The certificates are dated Aug. 1, 1920, and are due serially $100,000 Feb. 1 and Aug. 1, from 1921 to 1925. They are secured by twenty steel interurban passenger cars, fifty-six Peter Witt city passenger cars and ten Cleveland type trailers, costing more than $1,340,000. The company is now paying dividends on $5,451,000 preferred stock and 7 per cent dividends on $9,100,000 common stock.

Bonds Exempt from Taxation.—Judge Louis B. Ewbank, sitting in the Circuit Court at Indianapolis, Ind., has ruled that bonds issued by the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company and later bought up by the companies and put into the sinking fund are not taxable. The ruling was in a suit brought by the State for collection of $313,413 in taxes said to be due on the bonds for the years from 1904 to 1918. Of this sum $192,653 has been placed on the tax duplicate on alleged valuations of the bonds from $38,104 in 1904 to $1,138,310 in 1918. The taxes were placed on the tax duplicate after a report was made by W. F. Charters, a tax expert, that the bonds were being withheld from tax returns. The companies appealed the case to the Circuit Court. In announcing his ruling, Judge Ewbank said that he was unable to see how he could increase his wealth by writing checks to himself, or by keeping a promissory note which he had given and redeemed.

Toronto Railway Seeks City's Help.—The Toronto (Ont.) Railway finds itself with extraordinary charges to meet. Among them the payroll of the company will be about $2,000,000 more for the year commencing July 1 than it was for the previous year. In consequence the company has asked the city for permission to defer for the present current payments to the city. Under its agreement with the city the company pays the city a graded scale of percentage on its gross earnings in monthly installments. The company now finds that under the present rates of fare it cannot meet its obligations promptly and pay the percentages monthly as in the past, and has requested the indulgence of the city to allow the payments, or such part of them as the company may require, to be deferred until the end of the franchise, so as to enable the company to meet the payrolls, ordinary expenses of the company and other obligations, on the understanding that the accumulated percentages owing to the city will be a first charge on the assets of the company, to be deducted out of the award of the arbitrators when the property is taken over by the city on Sept. 1, 1921. The company has suggested that it would simplify the proposition were the company to meet its monthly obligations by giving promissory notes, payable at such dates as would be agreeable to the city.

Traffic and Transportation

Bridgeport Still Trolleyless

City Authorities Fail to Move for Return of Electric Cars—Company Stands Pat

Bridgeport's electric cars are still on vacation. Although more than a week has passed since the Connecticut Company halted service on its Bridgeport city lines there is little prospect of immediate resumption of operation. The city authorities have taken no steps to end the trolley-jitney deadlock which resulted when Judge Banks on July 22 refused to dissolve a temporary injunction restraining the city from enforcing the terms of an ordinance which proposed to halt this competition with the railway lines.

Judge Banks, while ruling that the measure as passed by the City Council was illegal, pointed out that the city had the power to regulate the buses. He also indicated what steps should be taken by the Council to secure this end. Nevertheless, the Council has taken no action looking to passage of a new anti-jitney law. Latest indications, according to newspaper reports, are that the Council is ready to legislate if the cars will come back.

Buses Still Popular

Buses are still the Bridgeporters' chief means of conveyance. Several hundreds of the vehicles are still operating through the streets formerly occupied by the trolleys. Apparently the total number of buses operating remains about constant. They are giving a service which is handling the traffic which is offered to the satisfaction of a large part of the people who are using the buses.

Some interesting sidelights on the situation of a trolleyless city are beginning to show up. While the traffic offered is being handled, the records of the merchants of the city are in many cases indicating that the traffic that used to exist does so no longer. In other words, some of the larger stores are finding that their sales are much below normal, and they attribute this to the fact that large numbers of their better customers are not coming in on buses, whereas they used to come in on the electric cars.

Individual traffic officers say that their problems at the corners are not changing much, but viewing the city as a whole it has been found necessary to add about sixten more officers to place on additional corners which have never had traffic officers before, and to double up on some of the busier corners. This is apparently to give greater protection to pedestrians, with a larger number of units passing at a somewhat higher speed.

There is still present the cream-skimming jitney owner of the type who owns a little store and leaves it under the care of other members of the family while he operates his bus on profitable routes in the busy morning, noon and evening hours. While this assists in handling the rush-hour problem, it reduces the total number of available buses for steady work, and some parts of the town are experiencing service headways three to four times as long as under the electric car operation.

Sentiment Favors Trollies

There is a changing sentiment in the press and public opinion which might be characterized as the result of the novelty of the situation having worn off. Criticisms of the bus service are commencing to appear in greater numbers.

Fair weather has continued to assist the jitneys and buses in the transportation problem without the trolleys.

Memphis Needs Higher Fare

T. H. Tutwiler and Frank S. Elgin, receivers of the Memphis (Tenn.) Street Railway, have filed with the federal court at Memphis a report of the results of the service-at-cost plan, in force on the company's lines for the past three months. While no direct request for an increase in the rate of fare from 6 to 7 cents is included in the report, the receivers show that the company is now operating at a loss. The report shows a detailed deficit of $7,936 in the past three months.

Under the original order issued three months ago a full report was to be made to the court by the receivers showing the earnings of the company and the expenditures for a three months' period. The court is to be the judge of whether any increase in fare is justified.

The report shows expenditures for the three months April 1 to June 30, inclusive, of $831,854, with revenues of $823,918. In addition to the deficit of $7,936 the report shows a deficit in the "fare index" fund of $42,524 for the six months from Jan. 1 to June 30, 1920, while for the entire year from July 1, 1919, to June 30, 1920, the deficit in this fund is $54,872. This fund was set aside to stabilize the fare. The court decreed the fund should reach the sum of $60,000 before the company would be entitled to an increase on the 6½ per cent allowed as a fair return on the investment of the stockholders. The deficit in the operation of the system as well as the deficit in the fare index fund must come out of the revenue in addition to the operating expenses, according to the report.

"Safeties" in Los Angeles

Forty-five One-Man Cars Soon to Be in Service—Rerouting Results Satisfy

With the introduction of one-man safety car service on July 9, the Los Angeles (Cal.) Railway entered the final phase of a thorough reorganization of the system which began with the rerouting of all lines on May 9. Forty-five Birney safety cars are to be placed in operation, twenty-two having been received up to the present time. The company proposes to have 100 of the cars in service eventually.

Operation of the safety cars was started on two lines. One, known as the Vermont Heights line, is a shuttle which serves an outlying district and connects with the terminal of two lines that run through the main business section of Los Angeles. Two cars are operated in the morning and evening rush hours and one at other times. The second line on which safety cars are operated is the East Jefferson-Thirty-eighth Street run. It traverses a cross-town street approximately three miles south of the main business district and connects ten lines running to the business district. Two of the cars are operated throughout both the day and night.

Rerouting Results Satisfactory

While preparations were being made for introduction of the safety cars the Los Angeles Railway and the Los Angeles Board of Public Utilities co-operated in making an exhaustive check of results from the rerouting of the company's lines. The company furnished the men necessary for the check and co-operated in every way. Conductors issued to passengers a small card with these questions:

1. Your destination?
(If in business district state cross streets.)
2. Will you transfer?
3. Are you satisfied with the route of this car from the RESIDENTIAL district to the BUSINESS district?

Added to this saving in time for passengers and an increase in the feeling of good will toward the company, there has been a saving of 700 car miles daily, with proportionate reduction in power consumption, depreciation, etc. The daily mileage total for all lines under the old system was 84,804 car miles. With the rerouting this has been reduced to 84,095 car miles. The average number of cars in service daily is 753.

In advising the public of the rerouting changes, considerable newspaper advertising space was used for several days before the contemplated changes. The advertisements carried the detailed routing under the new plan. Folders containing this information, together with the signs and schedules, were placed on the cars and distributed through public organizations. Cards showing on what streets to get cars in the downtown district were attached to lamp-posts in the business district by special permission of the civic authorities.

Ten Cents Cash on Chicago "L"

Four Tickets for 35 Cents—New Temporary Order Became Effective on Aug. 4—Ruling on Valuation

In response to the petition of the Chicago (Ill.) Elevated Railways filed on June 24 last, for authority to place in effect a 10-cent cash fare in order to enable the company to meet the increases in operating expenses incurred since the commission authorized a rate of 8 cents cash and two tickets for 15 cents, the Illinois Public Utilities Commission on July 31 authorized a new temporary rate of 10 cents cash with four tickets for 35 cents within the city limits. Between any two stations north of Howard Street, the city limits station, the fare is made 7 cents. Through tickets between any station south of Howard Street in Chicago and any station north of Howard Street in Evanston or Wilmette will cost 13 cents, but where a through ticket is not purchased the fare is made the sum of the two local fares, or 17 cents.

THE order of the commission points out that the possible number of passengers that will be carried during the ensuing year is 190,000,000 and that by charging the rate authorized, including revenue accruing to the companies from sources other than transportation of passengers, the elevated roads will earn approximately $17,570,000. With respect to the expense account the commission finds that the companies will be required to expend during the year for maintenance of way and structures, $1,400,000; for maintenance of equipment, $1,450,000; for power, $1,360,000; for conducting transportation, $7,575,000; for traffic, $35,000; for general and miscellaneous expenses, $725,000; for taxes and car licenses, $1,070,000, and for rentals, $330,000; or a total of $13,645,000.

Deducting this amount from the estimated total revenue there remains available for depreciation and return upon the investment, the sum of $3,625,000, which is equivalent to a rate of return of 5.1 per cent upon the value of $70,943,000, fixed in an ordinance passed by the Chicago City Council on Aug. 14, 1918. The commission points out that this return would be substantially reduced if adequate allowances were made for the depreciation constantly accruing on the properties.

Expect More Ticket Sales

With the ticket rate of two tickets for 15 cents, which has just been superseded, the number of ticket fares collected was approximately 74 per cent of the total. With the new ticket rate of four tickets for 35 cents, which makes a greater differential in favor of the ticket fare, it is logical to assume that there will be a higher percentage of ticket fares to total fares collected.

Effective June 1, 1920, the wages of all employees of the Elevated Lines were substantially increased, adding to the operating expenses an estimated sum of $1,756,000 annually. This formed the controlling consideration in the decision of the commission to grant a temporary order at this time, the companies having been unable to meet the increased wages. In this connection the employees have been very considerate of the position of the company, and have acquiesced in the necessity to defer payment of the increases until the company should find itself in position to pay them through increased fares.

Companies' Need Urgent

With reference to the justice of the temporary orders increasing the fares, the commission has this to say:

> That the petitioners are entitled to the financial relief hereinafter authorized is beyond question. At the time the fares were increased from 5 cents to 6 cents, an advance made necessary by the action of the National War Labor Board in increasing wages, it was thought by many that the close of the great war would cause a quick return to normal conditions, and that higher fares would be in effect only a comparatively short time. But the prophesies of these persons have not been realized.
>
> Results of operation under the increased fares heretofore authorized by the commission clearly show that the relief then granted has been the minimum that could escape a judgment of confiscation in our courts. In no case have the advanced fares thus authorized produced a rate of return which any court would consider reasonable on the least possible value which could be assigned to the properties, but we have been of the opinion that these rates would enable the companies to operate without serious injury to their financial condition or the services they provide until the value of the property and other factors vital in a rate-making proceeding could be placed in evidence. But the recent large wage increase is a burden greater than the companies can bear without assistance, and it seems plain that they could not reasonably be asked to wait for further relief until such time as the issues in this case have been finally decided. Believing thus, we are of the opinion that the relief which is provided by the rate hereinafter authorized cannot justly be deferred until the final determination of the questions involved in this case.

History of Fare Case

The rate situation of the elevated roads first came before the Public Utilities Commission on Sept. 2, 1918, when the companies filed schedules which proposed to advance the passenger fares from the flat rate of 5 cents to one of 7 cents on all lines within the city limits. On Nov. 19, 1918, the commission entered a temporary order authorizing the companies to increase the rates from 5 cents to 6 cents. The application was admittedly of an emergency nature, and no attempt was made by the companies to place in evidence all the elements that were necessary to enable the commission to determine the fair rate-making value of the properties.

Subsequent developments in the case were as follows:

> On Aug. 4, 1919, the companies applied for a further increase in rates made necessary by the increase in wages of $2,435,515 per annum which became effective Aug. 1, 1919. This petition also stated that the deficiency in net earnings while operating under the 6-cent fare between Dec. 1, 1918, and July 1, 1919, amounted to $588,889. On Aug. 6, 1919, therefore, the commission entered an order authorizing an increase in rates from 6 cents to 8 cents. On Feb. 1, 1920, the commission issued a supplementary order authorizing a cash fare of 8 cents, or two tickets for 15 cents, within the city limits, and a cash fare of 6 cents north of Howard Street and a through-ticket rate from Evanston to Chicago of 12 cents. This order was to remain in effect until July 31, 1920, on which day it was superseded by the order authorizing the rates of fare set forth in the first paragraph.

Valuation Case Near End

As to the valuation proceedings in the elevated case, the commission has ruled that the city of Chicago must complete its evidence prior to Sept. 20, 1920, after which the companies will have ten days to cross examine witnesses for the city or to present such rebuttal evidence as they desire. The companies have already placed before the commission voluminous evidence concerning the original cost of the properties, their cost to reproduce using prices prevailing (1) in 1916, and (2) at the time of valuation in 1919, with these costs depreciated to correspond with the physical condition of the units.

Investigation of this evidence submitted by the companies has been carried forward so that the commission has reached conclusions on part of the evidence. From this investigation the commission takes exception to a portion of the maintenance expense, to the replacement reserve, the expense of making the valuation submitted to the commission, and the federal income tax deduction which the company made. In reference to maintenance the commission states that evidence clearly shows that during the past year the companies have spent much more for maintenance of road and equipment than the average in the eight years prior to 1918. After making due allowances for increased costs of labor and materials the commission holds that it is obvious that in the past year a larger volume of work than usual has been done. It is pointed out, however, that it is not to be concluded that the work done by the companies is unnecessary.

Referring to the "replacement reserve" the commission states that beginning Oct. 1, 1919, the companies opened an account designated under this heading, to which has since been charged $65,113 each month, or a total of $586,017 in the nine months ended June 30, 1920. It is pointed out that other than indicated by its name, the purpose of this fund is not made clear by the evidence and that the amounts charged to this account form merely an additional burden upon operating expenses, and one which evidence thus far adduced fails to justify. The commission makes it very clear, however, that it does not in any way question the right or the desirability of the creation by the companies of a fund that will adequately care for the replacement of various articles when they shall have come to the end of their useful life, and states that in subsequent orders due consideration will be given this matter.

Connecticut Fares Up

Commission Grants Company 7-Cent Basic Rate to Meet Emergency —Permanent Order Later

The Connecticut Public Utilities Commission on July 30 granted the petition of the Connecticut Company, New Haven, for a 7-cent basic fare on all its lines except the New London division. The commission limited the time of operation of the new fare to the period ending Sept. 30, when it will reopen the fare question. The mileage-basis zone system put in effect by the company on Nov. 2, 1919, and which was upset and superseded by the commission's substitute zone system on May 9 of this year will give way on Aug. 8 to the new system, which approximates that obtaining when the company charged an initial fare of 6 cents. The initial fare will allow a person to travel to any point within three miles of the traffic centers of cities and two miles from the traffic centers of towns, with a cost of approximately 3 cents a mile for all distance traveled thereafter. All transfers are to be free.

Emergency Relief Needed

Because of the urgent nature of the situation, the commission states that an emergency plan of relief is needed. It is not certain, however, that the 7-cent basic fare plan is best calculated to meet the needs of the company and the public. It therefore makes the new rates temporary. Monthly commutation tickets ars to be sold by the company at the rate of 2¼ cents a mile. These are to be issued for use between the traffic center of any incorporated city or borough having a population of 25,000 or more and points more than five miles distant therefrom.

The commission's order says in part:

It is hereby ordered that the rates now in force under commission's order dated March 30, 1920, issued under docket No. 3243, be and the same are hereby suspended from on and after Saturday, August 7, 1920, and the petitioner, the said Connecticut company, is hereby authorized and permitted until further order of the commission in the premises, to put into effect on August 8, 1920, a flat rate system of fares, socalled with an initial fare of 7 cents for the first zone and 6 cents per zone thereafter; the zones in cities to be approximately three miles in length, radiating from traffic centers, and corresponding substantially to the present three one-mile zones; and all other zones to be substantially two miles in length, corresponding approximately in length to, and including two of the present mile zones; with free transfers at all transfer points.

The company shall issue commutation tickets, good for round trip daily between the traffic center of any incorporated city or borough having a population of 25,000 or more, according to the latest authenticated census, and points more than five miles distant therefrom, on all lines radiating from such traffic centers, for the number of days in any month less Sundays and legal holidays; said commutation tickets to be sold at the rate of 2¼ cents per mile; to be issued to the individual commuter; to be non-transferable,, and to expire at the end of each month. School tickets shall be issued at one-half regular rates.

On account of uncertainty of zone limitations in the 7-cent zone plan submitted by the company, and the creation of new fare limits thereby, it was deemed advisable to establish a 6-cent zone for areas already substantially determined under the present mile zone system, but retaining 7 cents as the initial fare.

The commission is not satisfied that the temporary rate herein authorized is a proper rate or that it will produce the revenues needed and expected by the company, but it is permitted on the urgent request of the company as a temporary and an emergency rate. * * *

The commission is of opinion that if there is to be a return to the flat rate system, the general public would be better satisfied with a return to substantially the old flat rate zones or fare limits, but it is now claimed by officers of the company that a flat rate of 7 cents on the old flat rate areas would not produce sufficient revenue to allow the company to continue operation. * * *

The new 7-cent fare limits are within the limits of the old 5-cent and 6-cent flat fares which the Connecticut Company formerly used. Also under the former 5-cent and 6-cent basis the suburban zones were from 2⅛ to 2⅝ miles in length; with the present zone markers set approximately a mile apart it occasioned much less difficulty to instal two mile zones at 6 cents than to reinstate the former zones at 7 cents, which was suggested.

Collection Plans Vary

There will be several methods of fare collection. On the whole the fare collection scheme will be based on the pay-as-you-enter principle, on all of the two-man cars equipped for that purpose. On cars running outside of the 7-cent zones, pay-within collection will be used for the additional zones. An exception will be made in the case of the through interurbans, in which the interurban tickets described in the issue of March 6, 1920, page 480, will be used. A few old-type cars for city service will operate entirely on the pay-within principle, whereas all the one-man cars being operated entirely within the 7-cent fare limit will be operated pay-as-you-enter approaching traffic centers, and pay-as-you-leave outbound from traffic centers.

The metal tokens which the Connecticut Company introduced under the 6-cent fare regime will be reinstated as 7-cent tokens. A few of these are still out, and those which cannot be located will of course have to be accepted for 7 cents.

Interurban Handles Freight in Strike

The Galveston-Houston Interurban Railway, running from Galveston to Houston, Tex., has recently entered the lists of freight carriers. With the tie-up at Galveston resulting from the strike of longshoremen, and the urgent demand by merchants and others for freight tied-up in steamer holds or in waterfront warehouses, an agreement has been reached under which merchants of Houston and other points are receiving their merchandise at ship-side and are re-shipping to destination. This step was decided on when the authorities at Galveston promised armed protection to such merchants in their unloading freight from steamers and transporting it from waterfront to freight depot. Hauling out of Galveston is being done by the interurban, a rate of 35 cents a hundred pounds from Galveston to Houston being put into effect for such shipments, exclusive of drayage.

Discipline by Bonus

Pacific Electric Railway Tries Out Merit System in Transportation Department—Extra Pay Allowed

A system of discipline based on a plan of merits and demerits is now in operation in the transportation department of the Pacific Electric Railway, Los Angeles, Cal. The new regulations apply to motormen, conductors, brakemen, yardmen and gatemen. Employees having no demerits marked against their names will receive at the end of the year $5 in the form of a bonus for each month worked.

Access to Records

An individual record is kept of each employee to which the employee is permitted access at any time. An accumulation of seventy-five demerits results automatically in discharge from service. If extenuating circumstances exist and under proper authority reinstatement is approved it will be with fifty demerits aganst the employee's record. A second accumulation of seventy-five demerits will result in permanent dismissal.

Credits are allowed for commendable acts, deeds of heroism and loyalty and good judgment in emergencies. For meritorious service avoiding accident, or unusual assistance in crisis, or any commendable act out of the strict line of duty, ten merits are credited, subject to the approval of the head of the department. A clear record for six months brings fifteen credits and if fradulent transportation is detected five merits will be granted.

Demerits are issued for a number of causes. Among these are reporting late to work or missing runs, discourteous acts toward passengers, smoking or reading on duty, inattention to duty, careless handling of equipment, disregarding signals, laxity in flagging, leaving switch locks open, general neglect in reporting accidents, lack of neatness, careless conducting of transportation in its various forms, and for various other causes.

$5 Monthly Bonus

The company is setting aside a fund equivalent to $5 a month beginning April 1, 1920, for each employee in the above classes. This will be credited to the record of the individual on Dec. 1 of each year, but on Nov. 30 of each year there will be deducted $1 for each demerit received during the period. The balance will be paid to the employees who have been continuously in service for the period since the last payment. The fund accumulated by these deductions will be set aside by the company for hospital or other relief purposes for its employees as it may elect.

Employees laid off on account of reduction in force, through no fault of their own, will be entitled to receive bonus pro rata for the period worked With this exception no one not in the employ of the company on Nov. 30 of each year will participate in the bonus.

Transportation News Notes

Will Abandon Freight Service.—Effective Aug. 9, the freight service of the Ohio Valley Electric Railway, Huntington, W. Va., will be discontinued. Following a recent fire the company was ordered by the State fire marshal to tear down the freight station at Third Avenue and Seventh Street.

Six Cents Despite Mayor—The City Council at Canton, Ohio, has passed an ordinance over the veto of Mayor Herman R. Witter, giving the Northern Ohio Traction & Light Company the right to a rate of fare of 6 cents or seventeen tickets for $1. The measure was first passed by the Council on July 2.

Higher Fare in Gary.—The Indiana Public Service Commission has authorized an 8-cent car fare for the Gary & Interurban Railroad, Gary, which operates in and between Gary, Hammond and East Chicago. The commission also fixed a price of $1 for a book of fourteen tickets. It permitted no change in transfer privileges.

Conductor Dies in Rear-End Smash.—A conductor in the employ of the Toledo Railways & Light Company, Toledo, Ohio, was killed on July 27, when a car of the Toledo, Fostoria & Findlay Railway crashed into the vestibule of his city car. Eight persons were injured. This is the second rear-end collision between interurbans and city cars in Toledo within the present year. Failure of brakes has been given as cause in both instances.

Fare Increase Asked.—The Columbus, Delaware & Marion Electric Company, Columbus, Ohio, has introduced an ordinance in the Marion City Council granting a fare of 6 cents cash or five tickets for 25 cents and free transfers on its lines in that city. The company addressed a communication to the Council explaining that the increased cost of labor, power and material made an increase necessary and showed comparative statistics of fares in other cities

Fare Action Deferred.—Because of lack of a quorum at the meeting of the City Council of Lima, Ohio, July 30, no action was taken on the proposed increase of fare from 5 to 6 cents on the city line of the Ohio Electric Railway. J. H. McClure, vice-president of the company, stated that the wage demands of the 1,100 employees cannot be met unless Lima, Newark and Zanesville grant the company relief before Aug. 10, when a conference with the men is to be held.

Safety Platforms in Fort Worth.—The City Commission of Fort Worth, Tex., has announced that platforms will be built as markers of the safety zones established for persons boarding or leaving electric cars. These platforms will be 1 ft. wide and twenty-four feet long and raised about four inches from the level of the street. Iron cones that now mark the safety zones will be placed at the ends of the platforms as protection against automobiles and other vehicles.

Would Charge 7 Cents.—At a hearing before the State Public Service Commission on an application of the Charleston (W. Va.) Interurban Railroad to increase city fares to 7 cents the company stated it had lost $13,398 during the last six months after allowing for interest payments and depreciation. Since the 6-cent rate went into effect four months ago the company has lost $5,600. There has been no diminution in the number of passengers because of the 6-cent fare.

Eight Cents in Port Arthur.—The City Commission of Port Arthur, Tex., has granted the Port Arthur Traction Company authority to install an 8-cent fare. The new rate was put into effect on July 27. The fare ordinance provides that tickets shall be sold at the rate of fifteen for $1. This action was taken by the city authorities on application of the company officials, who contended that service would have to be suspended unless higher fares were charged.

Ten Cents in Portland, Me.—The Maine Public Utilities Commission has authorized the Cumberland County Power & Light Company, Portland, to file a new schedule of rates on one day's notice to the public. The present ticket fare will be increased from 7 cents to 8 cents, and the present cash fare from 9 cents to 10 cents. The commision refused the company's request for a 9 cent ticket fare on the ground that through loss of patrons the company would eventually lose revenue.

Mayors Ask Higher Fare.—Resolutions recommending that the South Carolina Railroad Commission be petitioned to grant to the Charleston-Isle of Palms Traction Company, Charleston, such rates of fare and such relief as is provided by law under an act of the Legislature which was approved March 11, were adopted recently at a joint meeting of the Mayors, Aldermen, Wardens and Commissioners of Charleston, Mount Pleasant and Sullivan's Island. The company seeks to increase its fare, stating that unless a higher rate is granted it must cease operation.

Freight Service Expanded. — The Louisville & Southern Indiana Traction Company, New Albany, Ind., is now engaging in extensive freight service, hauling from eight to ten carloads of cement daily from Speeds, Ind., to Louisville, Ky. The haul is about twelve miles long. The plant of the Louisville Cement Company is located at Speeds and in past years some difficulty has been experienced in bringing an adequate supply of cement to Louisville. Louisville is said to be one of the few cities in the United States which is getting an adequate cement supply. A carload of cement is unloaded in Louisville two hours after it has been loaded at Speeds.

Mileage Rate Proposed.—Elimination of the present blanket rate to the various beach cities in the vicinity of Los Angeles, Cal., with rates to be entirely on a mileage basis, was proposed by C. A. Smith, general passenger agent of the Pacific Electric Railway, in his testimony before the State Railroad Commission at a hearing on July 19. Mr. Smith stated that by doing away with the blanket charge the company hoped to be able to increase its revenue approximately $266,000 over and above the $1,750,000 deficit for which general increases in rate of 33 per cent are being asked. The commission adjourned the hearings to Aug. 12.

Fare Rate Held Illegal.—An opinion recently handed down by Judge Smith of the Federal District Court holds that the rates charged by the Charleston-Isle of Palms Traction Company, Charleston, S. C., are illegal in that they violate the terms of a State law limiting fares to 3 cents a mile. The State Railroad Commission last year authorized the company to charge a straight fare of 3 cents a mile with a minimum charge of 5 cents. The company was later ordered by the commission to cease charging these rates. The company thereupon sought an injunction to restrain the commission from interfering with it in the collection of the 3-cent rate. The court held that the company has the right to abandon operation and to liquidate its assets.

Tries Out Five-Cent Fare. — By agreement with the Barre and Montepelier city authorities the Barre & Montepelier Traction & Power Company, Montepelier, Vt., will continue to charge a 5-cent fare on its lines in these cities for a period of four months. Although previously authorized to charge a 6-cent fare the company several months ago notified the municipalities that for a period of four months it would charge a 5-cent fare with the understanding that if the revenue proved to be greater than for the same period a year ago, when a 6-cent fare was charged, the 5-cent rate would be considered in force. Owing to the fact that the company's lines were tied up for several weeks last March, as the result of a severe snowstorm, the company suggested the continuance of the trial period for another four months.

Fare Rise Unopposed.—No opposition developed at the hearing on July 29 before the Public Service Commission for the Second District on an application of the Fonda, Johnstown and Gloversville Railroad, Gloversville, N. Y., to increase its rate of fare to 8 cents in the cities through which it runs and 12 cents between Gloversville and Johnstown. The net operating revenue of the company was only $710 for 1919. The operating revenue for 1919 was $274,840 and the operating expense

totaled $256,000. Taxes and other necessary expense left $710 as net revenue. The company has been negotiating with its employees for an increase in pay which is to be retroactive to May 1, and the understanding that the company has with the municipalities was that any increase in rates that the commission might allow should go to the men as wages.

Will Fix Capacity of One-Man Car.—Rankin Johnson, president of the Trenton & Mercer County Traction Corporation, Trenton, N. J., at a hearing before the Public Utility Commission on the operation of one-man cars, said the company might have to call upon the police to limit the load of the cars to fifty adult passengers each. H. C. Eddy, of the utility board, recommended that the company paint on each car in large letters the phrase "Load Limit 50 Passengers." He suggested that the company also place on the cars a removable guard rail designed to prevent passengers from crowding upon the front platform. Mr. Eddy said that he observed as many as sixty-seven passengers on a one-man car, and that frequently the loads are greatly in excess of fifty. He said the crowded conditions interfere with the work of the operator. The commission will issue an order later.

Would Raise Springfield Rate.—P. E. O'Brien, general manager of the Springfield (Ohio) Railway, has presented to the Springfield City Commission a petition for an increase in the fare charged by the company. The present fare is 6 cents. No specific rate is asked in the petition. If the present wage scale of employees continues, Mr. O'Brien told the commission, he could meet expenses with a 7-cent cash fare and a 6½-cent ticket. If an increased wage scale is demanded by the railway employees when their contract expires Oct 1, he said it would take an 8-cent fare to meet expenses. Announcement has already been made by the employees that an increase will be sought. The increase in wages from Oct. 31, 1919, to May 1, 1920, as compared with the previous wage scale is approximately $30,000. Under present financial conditions, there is no market for the company's securities, and its borrowing capacity is exhausted.

Wheeling Company Wants Eight Cents.—The City Railway, Wheeling, W. Va., has applied to the Public Service Commission for an increased fare to 8 cents. The hearing was set for July 29. The company also desires to be authorized to sell six tickets for 40 cents, and wants higher express rates. The Wheeling Public Service Corporation, operating between Wheeling and the Pennsylvania state line at West Alexander, Pa., a distance of 16 miles, has also applied for new rates, as follows: From Twelfth and Chapline Streets, Wheeling, to Elm Grove, a distance of 5 miles, or between intermediate points, 10 cents a passenger. Between Elm Grove and other points the fares are to be 7 cents to Triadelphia, 14 cents to Roney's Point, 21 cents to Valley Grove, 28 cents to West Alexander. The company also asks higher rates for school children, express packages and milk transportation. The Wheeling City Council has agreed to withdraw its opposition to the proposed increase on the city lines.

Buses Jeopardize Franchises.—Unlawful jitney competition with the lines of the Public Service Railway, Newark, N. J., is jeopardizing the company's corporate existence, according to an argument by Frank Bergen, general council of the company, at a hearing before Vice-Chancellor Griffin in Jersey City on July 26. The company some time ago filed suits in chancery to enjoin individuals and municipalities from operating buses in competition with the railway. Mr. Bergen contended that the defendent jitney companies have no right to operate on the public highways without first complying with the provisions of the so-called Kates act passed in 1916, requiring owners of jitneys, before beginning operation, to obtain the consent of the board or body having control of the public streets in the cities where they propose to operate. It was asserted that in many cases the defendants had not obtained the consent required by the Kates act, and hence are unlawfully competing with the company.

Jitneys Lose in Court.—Pending final court decision as to whether the city of Seattle has the power to halt jitney competition with the lines of the Seattle Municipal Street Railway, buses have continued operation in that city. Judge Everett Smith of the Superior Court recently signed an order quashing an alternative writ of mandamus obtained by the jitney drivers and dismissed from court the suit brought by the jitney interests to compel Comptroller H. W. Carroll to count the names of unregistered as well as registered voters in determining the sufficiency of the jitney initiative petition. The effect of the court order is that Mr. Carroll will not be compelled to count the signatures of 11,812 persons on the initiative petition, whose names do not appear on the registration books of the city. The jitney men will have to strengthen their petition by approximately 2,000 names before the City Council can be compelled to submit to popular vote in a special election an initiative ordinance in substitution of existing jitney regulations, permitting the buses to operate.

Approves Schenectady Rise.—The Schenectady (N. Y.) Railway has been granted the authority by the Public Service Commission for the Second District to raise its fare from 6 to 7 cents in Schenectady and in outside territory where a 6-cent fare is now charged. Transfer privileges are included and the company may sell five metal tokens for 35 cents. The new fares will become effective on three days' notice to the public and the commission and will remain in force for one year unless otherwise ordered by the commission. The new rates are controlling on the tracks of the Schenectady Railway and those of the United Traction Company, Albany, and the Hudson Valley Railroad. Increased wage payments on June 1 which will amount to $300,000 a year was one of the main factors in seeking to increase the fare. The city of Schenectady waived a limitation of fare under its local franchise so as to allow the increase in the city. There will be no changes in the through fares on the Albany division. The through fares on the Troy and Saratoga divisions will be a combination of the zone fares.

Hope for Louisville Rise.—With two ordinances now in the course of preparation to replace the service-at-cost bill withdrawn from the City Council of Louisville, Ky., by the Louisville Railway, members of the company's executive committee express confidence that "city officials will meet the situation in a spirit of fairness and save the company from receivership." Churchill Humphrey, a director and assistant general counsel of the company, is drawing up one ordinance and William T. Baskett, assistant city attorney, is drafting the other for presentation to the Council. The company's ordinance provides a 7-cent fare until rescinded by the Council, and for the payment by the company to the city of $168,000 annually for street repairs as long as this fare remains in force. The city's ordinance provides for the payment of a 7-cent fare for two years, with an automatic return to 5-cent fares at the end of that time, and the payment of $168,000 annually for street repairs "every year hereafter." It also stipulates that a valuation of the entire property of the company shall be made during the two-year period.

Six-Cent Fare in Richmond.—At a meeting of the City Council of Richmond, Va., on July 28, final approval was given to a 6-cent fare on the local lines of the Virginia Railway & Power Company. The Mayor approved the ordinance the following day and it went into effect on Aug. 1. Under the new ordinance the fare is 6 cents, or five tickets for 30 cents. The only reduced fares remaining are the 2½-cent school tickets. Free transfers are continued. This increase is an emergency measure pending a complete revamping of the company's franchise, and was asked for at this time in order to increase the pay of the carmen to that received by the employees on the Norfolk division, where a 6-cent fare has been in effect for about a year. The company's petition was unanimously indorsed by all the local civic organizations. Because nearby cities have 7 and 8-cent fares, and were thus able to offer better wages, the company's men were leaving for those cities, as well as for other lines of business which offered better pay. This resulted in many cars remaining in the carhouses because the company lacked men. The railway management candidly laid the situation before the public through advertisements in the daily papers.

Personal Mention

Mr. Ogburn Resumes Law Practice

Following the submission to President Wilson of the report of the Federal Electric Railways Commission, Charlton Ogburn, executive secretary of the commission, will resume the practice of law, with offices at 67 Exchange Place, New York City. The winding up of the commission's affairs will mark the conclusion temporarily, at least, of Mr. Ogburn's connection, which began three years ago, with the electric railway industry.

Early in the war Mr. Ogburn enlisted for military service, but because of inability to meet the physical requirements he took up government work in Washington and was placed in charge of the electric railway division of the National War Labor Board. He concluded more than 100 arbitration hearings involving disputes between electric railways and their employees, preparing the report and the tentative award in each case. He also served as personal arbitrator in a number of electric railway wage cases in Massachusetts, New Hampshire, Pennsylvania and New Jersey. Out of more than 100 arbitration awards made following his recommendations, in not a single instance did either party refuse to abide by the award.

Mr. Ogburn is a native of Georgia. Since graduating from the Harvard Law School twelve years ago he has engaged in the active practice of law. During the past six years his practice has been in the East, largely as representative of southern financial institutions. He has specialized in bonds and securities generally.

E. M. Walker Heads Illinois Association

Edwin M. Walker, general manager of the Terre Haute Traction & Light Company, Terre Haute, Ind., has been elected president of the Illinois Electric Railways Association. Mr. Walker is well known to the industry through his record as an operator and through his work for the American Electric Railway Association and the state organization.

Mr. Walker has been in charge of the Terre Haute traction and lighting system for the past three years. Before going to Terre Haute he served as general manager of the Dubuque (Iowa) Electric Company. He entered public utility work shortly after his graduation from Williams College with the degree of A. B. in 1897. After serving in various capacities with gas and electric light properties, he went to Muscatine, Iowa, as general manager of the Citizens' Railway & Light Company. He was later appointed general manager of the Union Electric Company, Dubuque, continuing in a similar capacity with its successor, the Dubuque Electric Company.

Directs Commission's Work

O. C. Merrill Appointed Executive Secretary of Water Power Commission —Drafting of Regulations Begins

Oscar C. Merrill, now chief engineer of the United States Forest Service, has been appointed by Secretary of War Baker to be executive secretary of the Federal Water Power Commission, formed under the provision of the water power act signed by the President last June. Complying with a request from Mr. Merrill, the Secretaries of War, the Interior and Agriculture, ex officio members of the commission, have designated the advisory committee to draft regulations for the granting of licenses under the act. General Crowder will represent the War Department, Herman Stabler the Interior Department and Mr. Merrill himself the Department of Agriculture.



O. C. MERRILL

Mr. Merrill began work for the Forest Service by making a special study of water powers in California. Soon thereafter he was designated district engineer, with headquarters in San Francisco. In the following year he was placed in charge of all water powers coming under the jurisdiction of the Forest Service. When in 1914 he was ordered to Washington to become chief engineer of the Forest Service he retained under his personal direction the matters pertaining to hydro-electric development.

Mr. Merrill was born in Manchester, near Augusta, Maine, in 1874. Following his graduation from the Massachusetts Institute of Technology in 1905, he spent one year as an instructor in the engineering department of the University of California. He then became associated with Charles G. Hyde and began his specialization in water-power consulting work.

Obituary

James Mitchell, Traction Financier

James Mitchell, president of the Alabama Power Company, and one of the leaders in the electric railway development of South America, died at his home at St. James, Long Island, N. Y., on July 22, following a stroke of paralysis. Mr. Mitchell had not been actively engaged in business during the past year.

Mr. Mitchell was born in Pembroke, Canada, fifty-four years ago. He came to the United States when a boy and settled near Milton, Mass. As a young man he worked for the Thomson-Houston Company, afterward part of the plant of the General Electric Company, at Lynn, Mass. He went to Brazil for this company and installed the first electric cars in South America. He also made some of the first electric railway installations in this country, his first being at Denver, Col. He contributed a number of important improvements of electric cars and other electrical equipment. He was one of the founders of the Brazilian Traction, Light & Power Company.

Axel C. Ekstrom, consulting electrical engineer of the Delaware & Hudson Company, New York, N. Y., and its allied lines, died on July 1 at his home in Ballston Spa, N. Y. As consulting engineer for the Delaware & Hudson Mr. Ekstrom had an important share in the management of the United Traction Company, Albany, N. Y., one of the D. & H. subsidiaries. He was well known to the electric railway men of New York State and was a prominent figure at the conventions of the American Electric Railway Association. Mr. Ekstrom was born in Stockholm, Sweden, August 24, 1861. He came to this country more than thirty years ago. He became affiliated with the Thomson-Houston Company of Lynn, Mass., later merged with the General Electric Company. In 1904 he left the General Electric Company to go with the Delaware & Hudson Company, with office at Albany, N. Y., as consulting electrical engineer. In the year 1906 he designed and constructed the steam power plant at Mechanicville, N. Y., which, from that time, has been furnishing electrical power to the Delaware & Hudson and subsidiary companies. He was also connected as electrical engineer with the Hudson Coal Company of Scranton, Pa.; the Chateaugay Ore & Iron Company, Lyon Mountain, N. Y., and was a director of the United Traction Company and the Schenectady Railway.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Graphic-Recording Meter Market Growing

Raw Material Supplies Rather Low But Shipments Can Be Made in Four to Six Weeks

Manufacturers of graphic recording meters uniformly agree that demand today is probably greater than ever before in that line, and not only have sales for the first half of this year greatly exceeded those of last season but inquiries seem to be steadily increasing. The remarkable favor in which this instrument stands can be traced to the growing tendency of power consumers and power producers to check up their costs. According to one of the big producers of recording instruments, hardly a single electric power installation is now made without including a graphic recording meter in the equipment. This of course has made it harder to make shipments to power house users.

A survey of the field reveals very short stocks in the hands of the manufacturers, but this condition is not so alarming as at first appears, in view of the fact that most of these meters are made to order and light stocks are usually the rule. But even so, the available supplies are rather sub-normal and the main factor promoting this condition would seem to be the rapid increase of demand, which has outstripped facilities for adequate production, even though that production at present seems to be proceeding at normal capacity, as judged by the standards of the past. Another consideration, of course, has been the freight muddle, and to some extent supplies of raw material, although this latter item was in several cases reported in pretty fair shape.

Under these conditions, deliveries in this market are considered pretty fair, although some manufacturers were much worse off than others in that respect. From four to six weeks were the best dates quoted, and other estimates ranged as long as ten or even twelve weeks. One of the producers who was among those able to make the quickest deliveries, stated that his shipments were sent only by express.

An entire absence of order cancellations is noted. Prices for graphic recording meters have remained stationary for about two months.

Should Supply Orders Be Scheduled Far Ahead?

Systematic Methods of Advance Buying Can Help Manufacturers and Buyers with Both Deliveries and Stocks

Purchasing agents of electric railways and other public utilities have learned to their cost since the days of pre-war deliveries that machinery and heavy apparatus cannot be had upon demand. The extension of time required in manufacture has not only enforced the placing of orders as early as possible but it has involved purchasing departments in "follow-up work" of a very expensive kind. Until materials become much more plentiful and until transportation conditions are greatly improved many of these practices will be obliged to continue, but this does not mean that economical purchasing is beyond realization, at least in connection with materials and supplies in general.

Recent observation of the purchasing agent's work emphasizes the continuing importance of applying the same systematic methods in the buying of miscellaneous supplies that have become essential in the ordering and checking of shipments of larger units of equipment such as motors, machine tools, rolling stock parts and pole line supplies. Forward ordering, should be cultivated to the maximum extent, feasible with the keeping of sufficient stocks for current needs. The necessities of operation, however, will always result in a certain measure of rush orders or belated buying. These must be cut down to the lowest possible terms if deliveries are to be anything like satisfactory, certainly until factory and jobbers' stocks are built up sufficiently to permit a return to the old practice of ordering for immediate shipments.

Something like a budget system is needed in determining the quantities and character of material wanted over a period of six to nine months, instead of letting orders drift until the operating departments put in hurry calls for material whose shrinkage might have been recorded and foreseen with a simple loose-leaf or card-index system applied intelligently to so-called "minor" supplies as well as to the more impressive items.

If more system is used in such buying, manufacturing requirements will become known farther in advance, material can be ordered more advantageously, labor will be assigned with reduced lost motion between successive jobs and production in general will become better controlled. This need not mean ordering for heavy stocks, but rather advance ordering for shipment when the material is to be utilized. Anything which permits the manufacturer to plan farther ahead tends to hold costs down, if not to enable actual reductions to be realized by the buyer. There is a load factor in sales of manufacturing-plant products no less than in the utility generating station, and the aggregate purchases of smaller supplies by electric railways are a decided factor in the manufacturing program, taking it the year through. Mass production of supplies means lower costs in the long run, closer competition for business and hence lower prices.

High Prices Postpone Buying of Material

The present level of high prices tends to encourage the railway purchasing agent in postponing supply orders until the gap between his stock room and attainable deliveries becomes dangerously small. Price cuts in the leather and textile fields have unquestionably resulted in postponing many orders for electrical material which otherwise would have gone through promptly. The quotation of "price at delivery" has discouraged long-distance buying. It would seem as though an understanding might be reached between railways and manufacturers on this subject. Well-scheduled orders placed in good faith far ahead of current requirements are an asset to both sides and deserve some concession as to price.

There is little evidence yet that electrical material prices will undergo any substantial reductions during the present year. The class of material in mind here is absolutely essential to operation and must be had regardless of price, barring the development of satisfactory substitutes. In the interests of continuous and reliable service, the purchasing agent, it seems, is justified in advance ordering beyond the limits that would be the criterion of normal times. No commission can justly condemn expenditures made in good faith to safeguard the service which must be rendered, so long as electric traction is a modern transportation agency. On the other hand, it is in the long-run interest of the manufacturer to co-operate with all efforts to schedule purchases far ahead, and if a fair profit is all that is sought, it should not be difficult to make price readjustments in settling bills for material in cases where the railway purchasing agent has helped both the manufacturer and his own company by far-sighted planning and placing of orders.

Chicago Surface Lines Plans to Buy Rolling Stock

Illinois Public Utilities Commission Releases Depreciation Fund for Purchase of New Cars

The Chicago Surface Lines, Chicago, Ill., has under preparation specifications for new cars, and these will presumably be placed in the hands of the car builders for bids within the next two weeks. The plans of the company have heretofore been to purchase 200 trailers and convert an equivalent number of present motor cars for hauling them. The recent order of the Illinois Public Utilities Commission making the funds ordinarily paid to a renewal and depreciation fund in accordance with city ordinance available for the purchase of new equipment will now make possible the financing which has heretofore held back the placing of an order for new cars. The commission ordered the company some time ago to purchase 200 new cars. With this money made available, it is possible that motor cars as well as trailers will be purchased, the number of each not having as yet been determined.

New Mogul Condulets

To meet a demand for condulets having an unusually long cover opening and big wiring chamber, the Crouse-Hinds Company, Syracuse, N. Y., has developed for the market a new series of "mogul obround" condulets. These are made in eight types, each type in eight conduit sizes ranging from 1 in. to 4 in. Four sizes of composition and cast-iron covers are made, the composition covers finished blank with from one to nine holes, the iron cover finished with or without round rubber gasket.

Rolling Stock

Gary & Hobart Traction Company, Hobart, Ind., will purchase one new safety car at a cost of $6,000. The company will pay $1,500 in cash for the car and permission has been granted by the Public Service Commission at Indianapolis for the issuance of notes to cover most of the balance.

Harrisburg Railways Company, Harrisburg, Pa., has purchased two McGuire-Cummings snow-sweepers for fall delivery.

The City Railway Company, Dayton, Ohio, expects to buy from fifteen to twenty new street cars.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C., advises it will purchase ten new 41 ft., double end, center entrance, 2-motor, double-truck, steel passenger cars, equipped with Westinghouse 514-A motors and H. L. control. Pantasote curtains, Keystone illuminated signs, Hale & Kilburn seats, Johnson fare boxes, Pittsburgh drop brake handle and hand brake, O. B. air sanders and Ideal trolley catchers will be installed.

Mesaba Railway Company, Virginia, Minn., will purchase one or two double truck, four-motor, pay-as-you-enter safety cars.

Morris County Traction Company, Morristown, N. J., is going to purchase one sweeper.

Escanaba Power & Traction Company, Escanaba, Mich., announces it has bought one single-truck McGuire Cummings sweeper, and two McGuire Cummings 45 ft., double-truck, 40,000 lb. passenger cars, equipped with two G. E. 57 motors, one of the cars being already in operation.

Detroit United Railway, Detroit, Mich., states it has completed fifty double-truck trail cars and is now building fifty double-truck motor cars. These will be followed by fifty additional trail cars which will be completed early next year it is expected.

Track and Roadway

Mobile (Ala.) Light & Railroad Company.—The Mobile Light & Railroad Company has placed contracts for the building of 1⅛ miles of carhouse tracks, curves, etc. The Lorain Steel Company has the contract for thirty-five curves.

Calgary (Alta.) Municipal Railway.—Commissioner A. G. Graves has prepared an estimate of the cost of completing the Centre Street extension of the Calgary Municipal Railway. An expenditure of $9,475 will be required exclusive of the rails.

Public Service Railway, Newark, N. J.—The Public Service Railway has laid new tracks from Camden to Moorestown to take the place of the tracks of the Burlington County Transit Company, which were removed by the latter company.

Public Service Railway, Newark, N. J.—The Public Service Railway has petitioned the Trenton City Commission for permission to run its tracks into a building on South Warren Street, Trenton, and to convert that structure into a terminal.

Hagerstown & Frederick Railway, Frederick, Md.—Plans are being worked out for the extension of the Hagerstown & Frederick Railway system from Hagerstown, Md., to Martinsburg, W. Va. Surveys are being made at the present time.

NEW YORK METAL MARKET PRICES

	July 1, 1920	August 3, 1920
Copper ingots, cents per lb.	19.00	19.00
Copper wire base, cents per lb.	22.50 to 23.00	22.50 to 23.00
Lead, cents per lb.	8.00	8.50
Nickel, cents per lb.	43.00	43.00
Zinc, cents per lb.	7.95	8.02½
Tin, cents per lb.	49.00	48.25
Aluminum, 98 to 99 per cent, cents per lb.	33.00	33.00

ELECTRIC RAILWAY MATERIAL PRICES

Rubber-covered wire base, New York, cents per lb.	28.00	28.00
Weatherproof wire (100 lb. lots), cents per lb.	29 00	29.00
Standard Bessemer Steel Rails, per gross ton	.....	45.00 to 63.00
Standard open hearth rails, per gross ton	.....	47.00 to 65.00
T rail, high (Shanghai), cents per lb.	3.00	3.00
Rails, girder (grooved), cents per lb.	3.00	3.00
Wire nails, Pittsburgh, cents per lb.	4.00	3.25 to 4.50
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.85 to 4.25	4.00 to 5.75
Railroad spikes, screw, Pittsburgh base, cents per lb.	7.50 to 9.00	.....
Tie plates (flat type), cents per lb.	3.00 to 4.00	4.00
Tie plates (brace type), cents per lb.	3.00 to 5.00	4.00
Tie rods, Pittsburgh base, cents per lb.	.....	7.00
Fish plates, cents per lb.	3.75 to 4.75	3.75 to 4.75
Angle bars, cents per lb.	3.75 to 4.75	3.75 to 4.75
Rail bolts and nuts, Pittsburgh base, cents per lb.	6.00	6.00 to 7.50
Steel bars, Pittsburgh, cents per lb.	4.25 to 4.75	2.35 to 4.00
Sheet iron, black (24 gage,), Pittsburgh, cents per lb.	4.20 to 6.85	4.20 to 7.85
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.25 to 8.05	5.25 to 8.55
Galvanized barbed wire, Pittsburgh, cents per lb.	4.10 to 4.45	4.45

OLD METAL PRICES—NEW YORK

	July 1, 1920	August 3, 1920
Heavy copper, cents per lb.	15.00 to 15.50	15.50 to 16.00
Light copper, cents per lb.	13.00 to 13.50	13.50 to 13.75
Heavy brass, cents per lb.	9.00 to 10.00	9.25 to 9.50
Zinc, cents per lb.	5.00 to 5.25	5.50 to 5.75
Yellow brass, cents per lb.	7.00 to 7.25	7.25 to 7.75
Lead, heavy, cents per lb.	7.00 to 7.25	7.25 to 7.50
Steel car axles, Chicago, per net ton	32.00 to 33 00	33.50 to 34.50
Old carwheels, Chicago, per gross ton	36.00 to 37 50	36.00 to 36.50
Steel rails (scrap), Chicago, per gross ton	27.50 to 28.00	28.00 to 28.50
Steel rails (relaying), Chicago, gross ton	31.50 to 32.50	35.00 to 36.00
Machine shop turnings, Chicago, net ton	9.50 to 10.00	9.50 to 10.00

ELECTRIC RAILWAY MATERIAL PRICES

Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.70 to 3.95	4.20
Car window glass (single strength), first three brackets, A quality, New York, discount*	17%	17%
Car window glass (single strength), first three brackets, B quality, New York, discount	37%	37%
Car window glass (double strength, all sizes AA quality), New York, discount	79%	79%
Waste, wool (according to grade), cents per lb	21 to 24	17 to 23
Waste, cotton (100 lb. bale), cents per lb.	16	15 to 17½
Asphalt, hot (150 tons minimum), per ton delivered	.....	38.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	.....	42.50
Asphalt, filler, per ton	.....	45.00
Cement, New York, per bbl.	4.80	5.10
Linseed oil (raw, 5 bbl. lots), New York, per gal.	1.63	1.58
Linseed oil (boiler, 5 bbl. lots), New York, per gal.	1.65	1.605
White lead (100 lb. keg), New York, cents per lb.	15½	15½
Turpentine (bbl. lots), New York, cents per gal.	1.75	1.65

*These prices are f.o.b. works, with boxing charges extra.

Mesaba Railway, Virginia, Minn.—The Mesaba Railway expects shortly to purchase line material for 8 miles of track. The grade has been completed and the steel purchased.

Durham (N. C.) Traction Company.—The Durham Traction Company expects to build 1½ miles of new track, including an extension of ¼ mile.

International Railway, Buffalo, New York.—Plans for the immediate expenditure of $570,000 by the International Railway, are being made, according to Edgar J. Dickson, vice-president of the company. This money will be used for relaying tracks and improving the roadbed in many streets in all parts of the city.

Hamilton (Ont.) Street Railway.—The Hamilton Street Railway proposes to construct a line from Margaret Street to Paradise Road and from Paradise Road west to the Dundas line.

Portland Railway, Light & Power Company, Portland, Ore.—Plans and specifications have been adopted by the Public Dock Commission for the extension of the St. Johns line of the Portland Railway, Light & Power Company to municipal terminal No. 4. Engineer G. B. Hegardt has been directed to advertise for bids for the work. The dock commission will furnish the rails, fastenings and specials, and bids will be asked for these.

Philadelphia (Pa.) Rapid Transit Company.—The Council's committee on transportation has considered favorably the petition of the Philadelphia Rapid Transit Company to construct an extension of its Sixtieth and Spruce Streets line to Overbrook.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—Application has been made by the Quebec Railway, Light, Heat & Power Company to the Railway Commission in Ottawa for permission to extend its lines in Belvedere Ward to St. Malo.

Dallas (Tex.) Railway.—The laying of a track on Masten Street has been started and the finishing of the work will be a matter of four or five months.

Texas Electric Railway, Dallas, Tex.—J. F. Strickland, president of the Texas Electric Railway, has inspected the three routes of the Dallas-Wichita Falls interurban line and in his opinion no definite route can be decided upon without further consideration.

Memphis (Tenn.) Street Railway.—The tracks on Main Street will be relaid. Work on Beale Street and several suburban streets is also in progress, the former being about completed.

Monongahela Valley Traction Company, Fairmont, W. Va.—The Monongahela Valley Traction Company proposes to install at Farmington, W. Va., a siding that will give the Mannington line of the company a connection with the Baltimore & Ohio Railroad tracks at that point.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The Puget Sound Traction, Light & Power Company will build a double track from Champion Street to Kentucky on Cornwall Avenue, in Bellingham. The work will include the laying of 7,100 feet of steel and will cost approximately $40,000.

Power Houses, Shops and Buildings

Regina, Sask.—The City Commissioners will construct a spur line to the new power house at the Parliament buildings. The cost will be $4,000.

Mesaba Railway, Virginia, Minn.—The Mesaba Railway expects to build within the next few months a substation near Hibbing, Minn.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—The Fairburn & Atlanta Railway & Electric Company expects to complete an office building within the next two weeks.

Morris County Traction Company, Morristown, N. J.—The Morris County Traction Company expects to build within the next four weeks a repair shop extension and a station and office.

Eastern Pennsylvania Railways, Pottsville, Pa.—The Eastern Pennsylvania Railways has purchased one 3,000-kw. steam turbo-generator set and four new Coxe stokers.

Mobile (Ala.) Light & Railroad Company.—The Mobile Light & Railroad Company has purchased and is now installing one 578-hp., 200-lb. pressure Sterling boiler. The company has purchased one 1,000-kw., Westinghouse, 600-volt geared turbo-generator.

Mobile (Ala.) Light & Railroad Company.—The Mobile Light & Railroad Company is building one steel carhouse, 100 ft. by 192 ft., with pits. There will also be open tracks outside for the storage of cars after inspection.

Los Angeles (Cal.) Railway.—At a substation of the Los Angeles Railway new facilities are being installed to tap the Southern California Edison Company's transmission line. At present the power is carried to a point near the downtown district and back to this substation. Another item of $15,000 expenditure is the installation of new feeders.

Trade Notes

The Pacific Car Building Company has contracted for a $150,000 factory in Woodland, Yolo County, Cal.

The Alphaduct Company, 136 Cator Avenue, Jersey City, N. J., has filed plans for an extension to its plant at 33-35 New Street.

The Electric Storage Battery Company, Philadelphia, Pa., has increased its capital stock from $18,000,000 to $30,000,000.

S. F. Bowser & Company, Inc., Fort Wayne, Ind., held its annual sales convention June 28 to July 2; it was the largest convention ever held by the company.

The Welch Armature Company, Welch, W. Va., manufacturer of electrical equipment, etc., has awarded contract for the erection of a three-story building, 63 ft. x 65 ft., to cost about $25,000.

The Delta-Star Electric Company, 2437 Fulton Street, Chicago, is having plans prepared for the erection of an addition to its plant, one and two stories, 100 ft. x 110 ft., to cost about $40,000.

The Spencer Turbine Company, 484 New Park Avenue, Hartford, Conn., manufacturer of blowers, etc., contemplates building an addition to its plant, 60 ft. x 125 ft., to cost about $45,000.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces the appointment of G. B. Kirker as manager of the railway division of the Los Angeles district office.

The National Association of Purchasing Agents will hold a convention in Chicago on Oct. 11, 12 and 13. A committee is working on a standardized invoice form which is attracting widespread interest because of its possibilities.

Willis H. Gilbert is now established at 710 Conway Building, Chicago, Ill. Mr. Gilbert is producing and selling Southern white cedar poles. He has opened distributing points at Atlanta, Washington, Birmingham, Cleveland, New Orleans and other points throughout the South and East.

Autocashier Company of America, 111 Broadway, New York, N. Y., has been incorporated under the laws of Delaware with an authorized capital stock of $5,000,000, to manufacture money-handling machines for use on street cars. The "autocashier" is electrically operated, handles coins of any denomination, retains and registers fares and automatically returns the exact change to the passenger. First deliveries of 10,000 machines are expected about October 1.

New Advertising Literature

Oil Separator.—Bulletin No. 1130, describing its Bundy oil separator, is being circulated by the Griscom-Russell Company, 90 West Street, New York City.

Electric Tools, Carbon Brushes, Etc.—Gilfillian Brothers Smelting & Refining Company, Los Angeles, Cal., is circulating catalog No. 7 on its electric tools, carbon brushes and ignition parts.

Brushes for Electrical Machinery.—The Morganite Brush Company, 519 West Thirty-eighth Street, New York City, has issued bulletin M.B.C. No. 1, in which it describes its different types of Morganite brushes for electrical machinery.

The Duff Manufacturing Company, Pittsburgh, Pa., has issued bulletin No. 304, describing a new automatic lowering jack of 15-ton capacity, suitable for use in the electric railway field.

For the Safety Car



There is no hand brake,
So light,
So quick,
So powerful,
as the

PEACOCK TYPE "G" BRAKE

People rely on the Safety devices which you provide. You cannot afford to take any chances with them.

It is human nature for the hurrying crowd to want to get home on the first car in sight. Sometimes 70 or 80 will pile on a One-Man car.

They weigh almost as much as the car itself. Have you provided the additional braking power to take care of a live load like this?

The Peacock Brake will give you this extra power more quickly and for less cost than any other equipment you install.

Write for our bulletins describing Peacock Brakes for One-Man cars.

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Bankers and Engineers

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Construction—Maintenance—Rehabilitation
ENGEL & HEVENOR
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THE COAL & IRON NATIONAL BANK
of the City of New York

Capital $1,500,000
Surplus $1,000,000 Und. Profits $363,051
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Offers to dealers every facility of a New York Clearing House Bank.

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FARES AND BUSES
More revenue from *more* riders
143 Crary Ave., Mt. Vernon, N. Y.

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Engineers—Statisticians
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Steam and Electric Railway "Checking"
Complicated Interurban and Ohmer Fare Register work a specialty. Confidential Investigations. Write for our proposition, "Prosecuting Dishonest Conductors." We maintain a special department thoroughly equipped for handling all strikes.
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Easiest and Quickest Fuse to Renew

Because of its few parts and surpassingly *simple* construction—free from complicated parts—the "Union" Renewable Fuse can be taken apart and put together much more easily than any other dependable fuse on the market.

This means a substantial saving in the cost of handling in these times of high wages.

But what is even more important, it means *saving good fuses from the scrap heap.* For experience proves that many workmen will use a *new* fuse rather than bother to renew one that is *hard* to take apart and put together again.

UNION RENEWABLE FUSES

can be renewed by simply unscrewing the caps, lifting off the washers and inserting a new link.

Simple, rugged, substantial, dependable, the "Union" Renewable Fuse will unfailingly give effective, *lasting* service.

Save time—save money—save trouble by insisting upon and getting "Union" Renewable Fuses. Also made in Non-Renewable type.

Sold by electrical dealers everywhere.

Send for booklet

CHICAGO FUSE MFG. CO.

Oldest and largest manufacturers of Fuses, Electrical Protecting Materials and Conduit Fittings.

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Boston, Cleveland, Los Angeles, Detroit, Kansas City, Pittsburg, Philadelphia, St. Louis, San Francisco, Seattle, Minneapolis, Indianapolis, Birmingham, Grand Rapids, Milwaukee.

DUFF GENUINE BARRETT JACKS

For Every Lift There's a Duff Proven Best

Duff Jacks for all lifts is a manufacturing policy which could not survive without sound and progressive designing, sure knowledge based on long experience, and high quality of materials and workmanship — finest resources at every stage of production.

Every lifting job has its own exacting needs as the size, capacity and type of jack required. Automobiles and trucks make their special demands. Railroads impose their own titanic lifting tasks. Duff Jacks, through special design for each purpose, serve them all equally well.

Since the original Barrett Jack demonstrated its labor-saving value for constructing and repairing track twenty-seven years ago, it has been a standard railway tool. The genuine Barret Jack is and always has been made exclusively by The Duff Manufacturing Co.

Today more than ever before, track maintenance work imposes terrific strains upon track jacks. Duff engineers have been alert to meet these conditions with improvements based upon the latest mechanical engineering practice. Bases have been reinforced, bearings enlarged, malleable iron replaced with steel for socket levers.

Duff Track Jacks can be furnished with either a round socket lever and wooden handle, or a square socket lever to permit use of steel lining bar as operating handle.

Write for Bulletin No. 303, which completely describes Duff Track Jacks

THE DUFF MANUFACTURING CO.
Pittsburgh, Pa.

New York Chicago San Francisco
Atlanta Houston



Among other jacks designed especially for electric railroad work are Automatic Lowering Jacks, standard tools for car repair shops; Emergency Jacks, for replacing derailed cars; Journal Jacks, for removing and inspecting journal brasses; and High-Speed Ball-Bearing Jacks, for bridge work.

For all lifts, in all kinds of service, use Duff Jacks—built by specialists, amply proven, best for each job.



TEXACO LUBRICANTS

for railway shop, power plant and rolling stock

Texaco Lubrication Engineers will gladly assist you in selecting the right Texaco Lubricants for your shop—power-plant, rolling stock, or any other equipment.

You may call upon them to make a survey of the equipment if necessary. This is Texaco Service—there is no charge.

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Type R 5



Type R 10

International Fare Registers

Protect Your Revenue

Shrinking revenues and increasing operating costs make an unusually difficult problem today.

The accurate record provided by International Registers gives a firm basis for judgment; dependable figures to indicate the steps necessary to a solution of today's problems.

More—they prevent those unknown losses at the point of collection by protecting all three parties—the passenger, the conductor, and the company. Visible and audible registration is the complete check on collections.

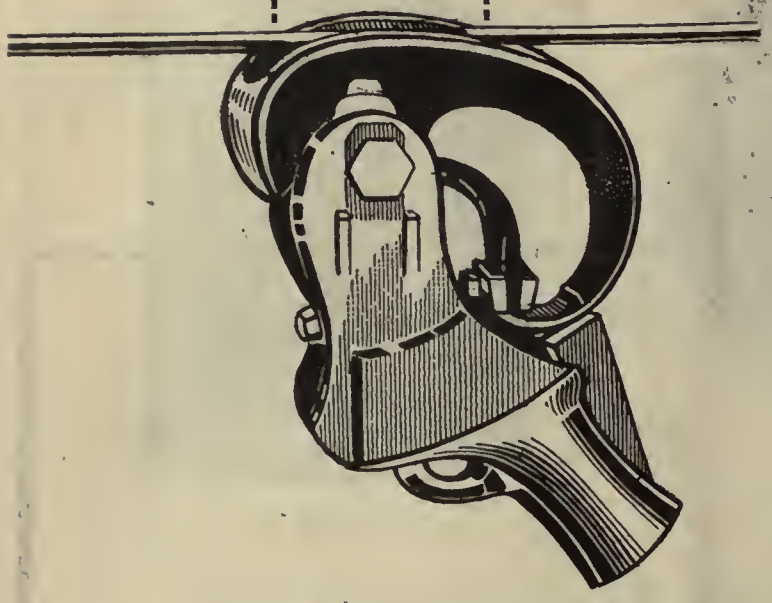
Our organization is ready for consultation on your collection problems.

The International Register Company

Manufacturers of Fare Registers and Railway Supplies, and General Selling Agents for HEEREN ENAMEL BADGES

Office and Factory: 15 So. Throop St., Chicago, Illinois

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In all current collecting devices the more contact you have the less friction exists owing to the tension being distributed over a greater surface.

Miller Trolley Shoe operation proves that the greater the contact surface more power is delivered to the motors, giving greater capacity for overloads.

THE MILLER TROLLEY SHOE

has a contact on the wire of 3 inches. This contact is permanent. The Shoe follows each little uneveness in the wire. It does not jump and eliminates all sparking.

Miller Trolley Shoes have solved many problems that were the outcome of low voltage.

We stand ready at all times to show you on your own lines just what an advantage can be obtained by equipping your cars with the Miller Trolley Shoe.

Write Today for Details

Miller Trolley Shoe Co., West Newton, Mass.

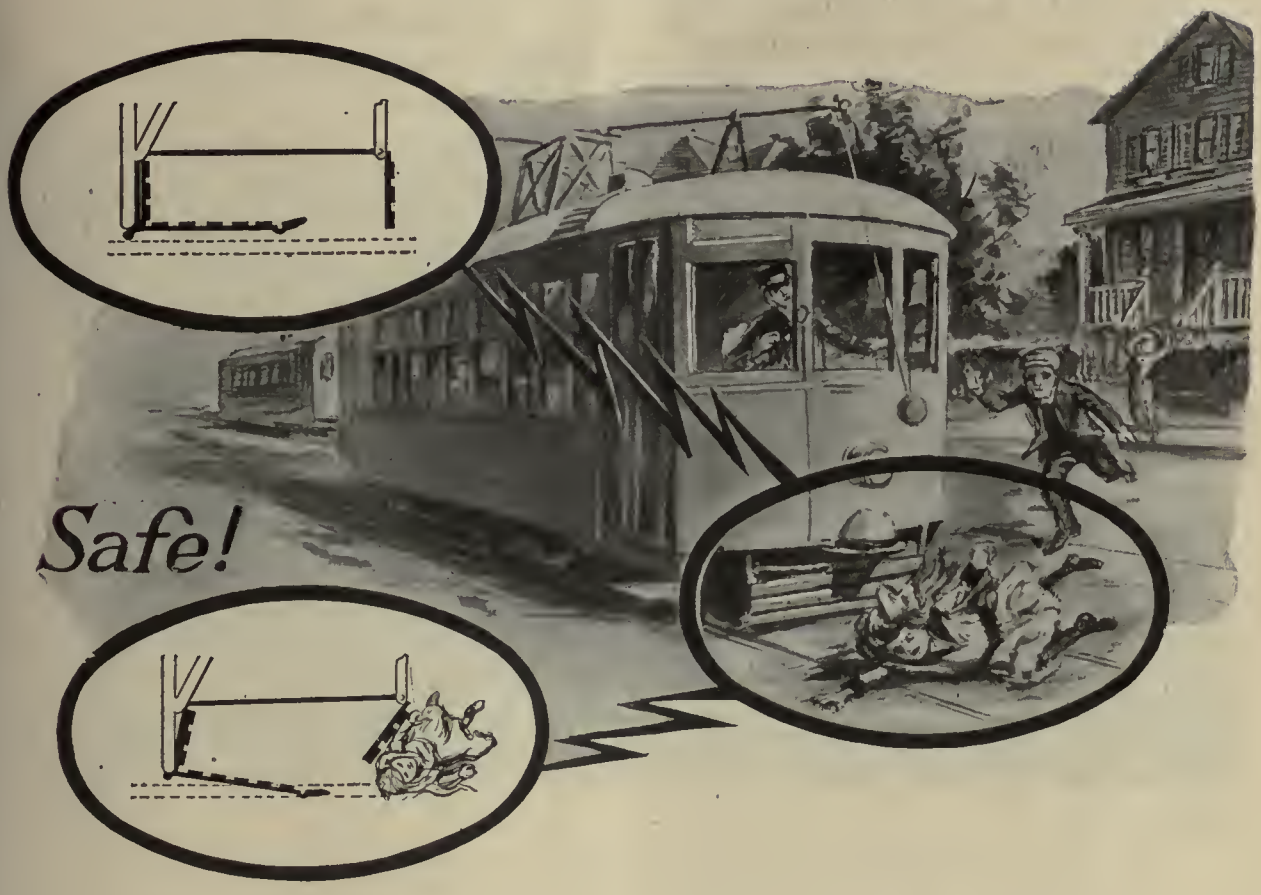
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Safe Service



The Safety Car is performing its duty in giving good service. When equipped with the H-B Life Guard it is assuredly giving *safe* service.

The unwary pedestrians are snatched from the wheels before any fatality may occur.

H-B Life Guards are not accident preventers but they truly are preventers of fatality.

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, N. Y.

Ghee

Natives of the East Indies use a kind of butter which they call ghee.

It is made from thickened milk, and when properly prepared keeps sweet for a long time.

But let an amateur design a gob of ghee and the consequences border on the fearful.

Instead of remaining sweet the poorly prepared ghee generates a high tension perfume that is second cousin to chloroform.

Thus with brushes.

The ingredients in Morganite brushes, made the Morganite way, produce a super-superior brush.

But let some cheap brush makers you know of try to handle the self same ingredients and—

Holy Ghee!



Morganite Brush Co., Inc.

Main Office and Factory: 519 West 38th St., New York

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Osgood Bradley Safety Cars

Excel in Use of Standard Materials and Parts



One reason why you will find Osgood Bradley Safety Cars the most economical to operate and maintain is that they make such extensive use of standard materials and parts.

The truck, for example, is made of commercial shapes throughout, even though the combination of those shapes is novel. In the case of the car-body side sash but one width of pane is used thus simplifying the replacement of broken glass.

And as for specific parts standardized by the American Electric Railway Association, the Osgood Bradley Safety Car not only embodies such widely used standards as the A. E. R. A. brakeheads and shoes, but has taken the lead in the adoption of the A. E. R. A. standard E-2 axles which carry 3¼-in. x 6-in. journals and a 4-in. motor bearing instead of the non-standard, smaller 3-in. x 6-in. journals with a 3¼ in. motor bearing. Osgood Bradley Safety Cars are Long Life Cars.

Builders of City and Interurban Cars

OSGOOD BRADLEY CAR COMPANY

Builders to Two Generations of Electric Railway Men

WORCESTER, MASS.



Better Service at Lower Cost

"Agasote" For Roofing—Headlining—Wainscoting
(*Trade-Mark*)

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"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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"The Public Be Pleased"



Competition has returned. The passenger who is treated well on your line thinks well—speaks well—of it.

If he can secure a clean drink of cool water when he is hot and travel-tired he increases the goodwill asset of your road.



DIXIE Cup

Penny Vending Machines

For Passenger Cars and Stations

have been standardized by one hundred and fifty railroads.

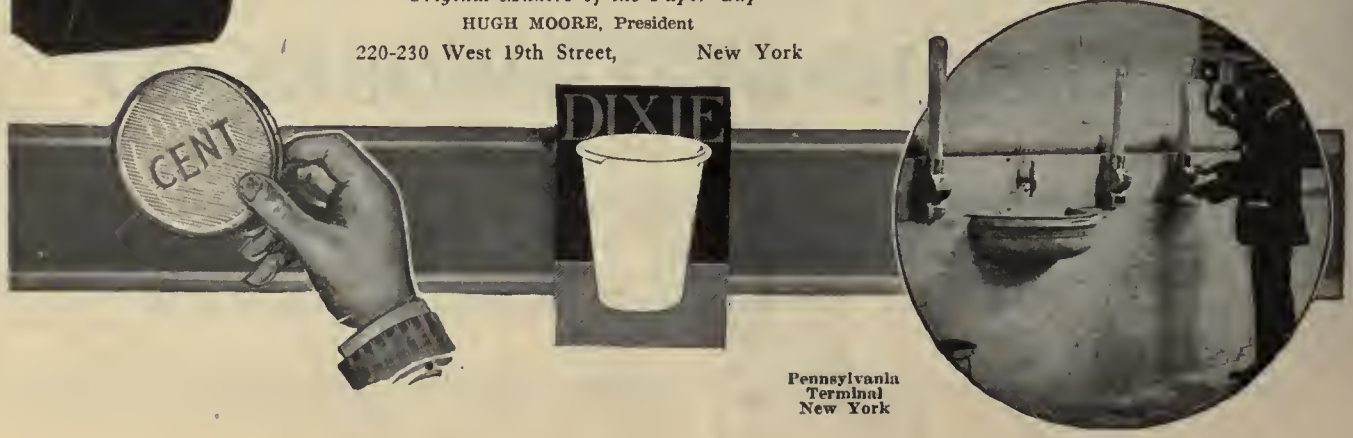
The people know this service and approve it. They meet it at hotels, theatres, department stores and in public resorts.

They are accustomed, and glad, to pay a penny for a round cup, glass shaped, but *safe* as well as pleasant to drink from.

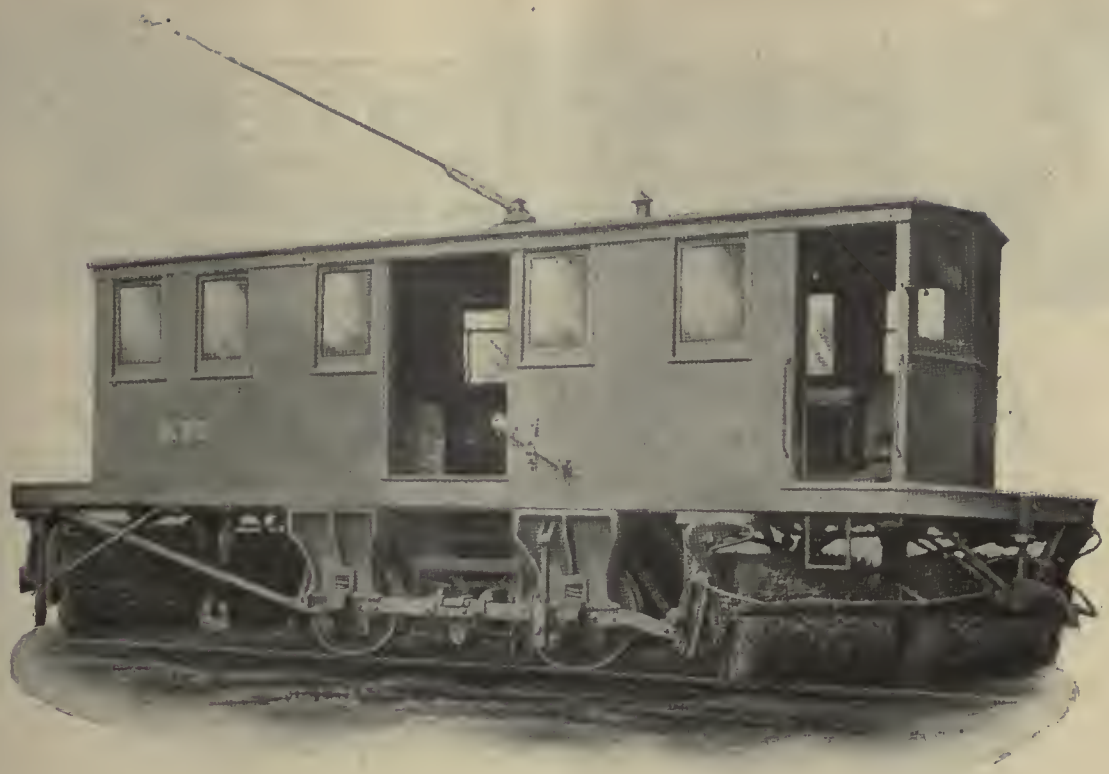
Therefore this service is self-supporting—*not an expense* to you.

Write today for sample cups and terms.

INDIVIDUAL DRINKING CUP COMPANY, INC.
Original Makers of the Paper Cup
HUGH MOORE, President
220-230 West 19th Street, New York



Pennsylvania Terminal New York



Mr. Superintendent:

It will be up to you to maintain your winter schedule.

Are you prepared to meet your snow-fighting requirements?

Emergency Conditions

cannot be met by *emergency* orders or plans! Lay out your snow-fighting campaign NOW!

McGuire-Cummings Mfg. Co.

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Found The World Over

"Found the World Over"

We're naturally proud of that

A considerable part of our business to-day is repeat orders or orders which come to us on our world-wide reputation.

Ackley Brakes are in Use in 40 Different Countries



Let us show you that an Ackley Brake is made for your every requirement.

The Ackley No-Staff—Bulletin D

The Ackley 2-E (Staff)—Bulletin E



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REG. U. S. PATENT OFFICE.

Varnished Cambric

Wires and Cables

are made with the same care and high regard for quality which distinguishes the production of Okonite rubber insulation.

We are prepared to handle any high-grade proposition, and solicit your inquiries.

"Manson" Tape (*Friction*), "Okonite" Tape (*Splicing Compound*)

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You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

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of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.



The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.



May We Send Our Catalog?

TRADE MACALLEN MARK.

The Macallen Company

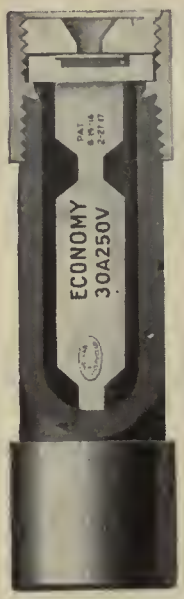
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TRADE MACALLEN MARK.

You Buy the Highest Type of Electrical Protection

in any circuit when you install Economy Renewal Fuses – made in both ferrule and knife-blade types in all capacities.

Accurate rating, practical, safe fuse construction and a dependability which has been proved for years in thousands of industries, large and small, make Economy Fuses first choice where efficiency is the first consideration.



Ferrule type with Economy "Drop-Out" Renewal link.

ECONOMY *renewable* FUSES



Knife-blade type with Economy "Drop-Out" Renewal link.

And You Cut Fuse Maintenance Cost 80%

compared with the maintenance cost of any "one time" fuse equipment.

Only the "Drop Out" Renewal Link is destroyed when the fuse blows.

Both ferrule and knife-blade types are easily and quickly restored without expensive delay in service.

Economy was the first line using inexpensive bare renewal links for restoring blown fuses to their original efficiency to be APPROVED IN ALL CAPACITIES by the Underwriters' Laboratories.

Sold by all leading electrical jobbers and dealers

Economy Fuse & Mfg. Co.
Chicago, U. S. A.

Economy Fusea are alao made in Canada at Montreal



CYPRUS BRONZE

The Brady Brass Company is the original manufacturer of the soft bearing metal known as Cyprus Bronze, which is now being used in almost every country of the world for

Engine Castings, Railway Journal Bearings and High Speed Motor Bearings

It is more generally known as M. C. B. Grade "A" Specification.

The original formula was developed by this company after a railroad experience of more than two score years, and from an economic standpoint—high in lead and low in tin contents—continues to meet with great favor.

Today we are selling Cyprus Bronze metals, M. C. B. Grade "A" Specification, wherever railways are operating. This has been made possible by the building up of a splendid organization of trained men, located in an up-to-date plant at tidewater of such a capacity as to insure prompt deliveries anywhere.

We respectfully solicit your inquiries

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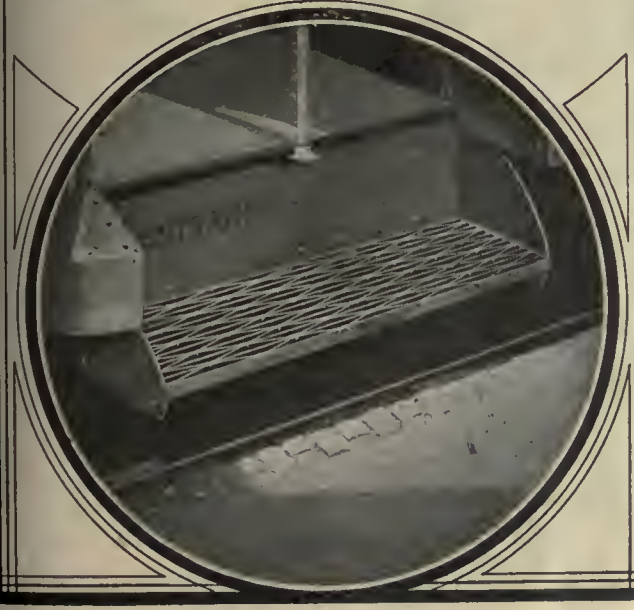
IRVING SAFSTEP

TRADE MARK
(PATENTED)
ABSOLUTELY NON-SLIPPING ALWAYS



Your riding public will surely be quick to recognize the "Safstep" as a real improvement, made in its interest. Its comfortable, foot-gripping, non-slipping surface—absolutely non-slipping in all kinds of weather—will give them a feeling of confidence, getting on and off. Then your stops will be shorter, because passengers will move more quickly getting on and off. You'll notice a speeding-up in your service. Ask us for Catalog 2A28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.



CYPRESS

"THE WOOD ETERNAL"

is NOT the *Best Lumber for ALL Railway Purposes*. For certain specific applications, however, in which railways have large lumber requirements, the use of all-heart Cypress develops very large *economies* in *maintenance costs*. For example, the Railway Signal Association in its standard specifications for wood to be used for "Trunking and Capping" has always placed all-heart Cypress among the first choices in the list of suitable woods.

The Railway Signal Association makes its recommendations as a result of definite *knowledge* of the subject, and its membership includes many able men who are Cypress enthusiasts. We gladly refer all doubters as to Cypress superiority to any well-posted railway engineer who has had experience with Cypress, "the wood eternal."

The same conditions of service which make Cypress superior for "Trunking and Capping" are present in many other railway lumber requirements, such as

FENCING

and similar purposes where the material is exposed constantly to the weather, and where it is consequently essential that it shall be highly capable of *resistance to decay*. That is the great and particular value of Cypress—it is *highly resistant to decay*. (All-heart especially.)

If railway men in general will study the question of wood durability for other uses as carefully as Railway Signal men have studied it in connection with "Trunking and Capping," there will be a lot more all-heart Cypress used in railway service—*to the very great economy of the companies using it*.

Our data is at your service.

SOUTHERN CYPRESS MFRS' ASS'N
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Safety Panels For Safety Cars

Each panel is placed above the vestibule window within easy reach of the motorman, and carries six switches mounted in separate compartments, controlling respectively the car lights, the compressor, the heater, the headlights, the buzzer and the register. N. E. C. fuse connections for each switch are also mounted in individual compartments, which can be opened only when the switch is "off," and all reachable parts are dead.

It is impossible for the motorman to touch live parts when operating the switch.

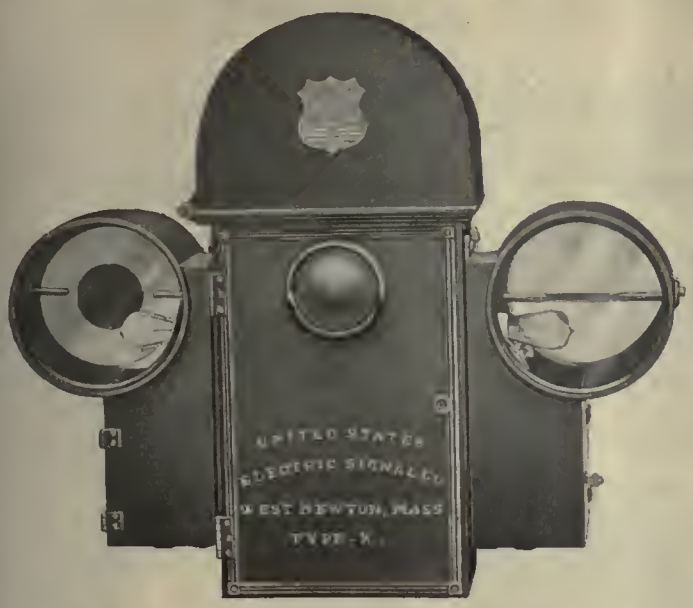


Krantz Safety Control Panel as Installed

The dimensions of the control panel are:

Length.....30½ inches
Width.....10 inches
Depth.....4½ inches
The weight is 55 lbs.

Westinghouse Electric & Manufacturing Co.
Krantz Works
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The signal best suited to your requirements is the one that is big, reliable and clearly discernible day and night. One so installed that the first car to reach the cut in contactor will have the right of way.

Those signals are U. S. Electric Signals, that prevent instead of cure.

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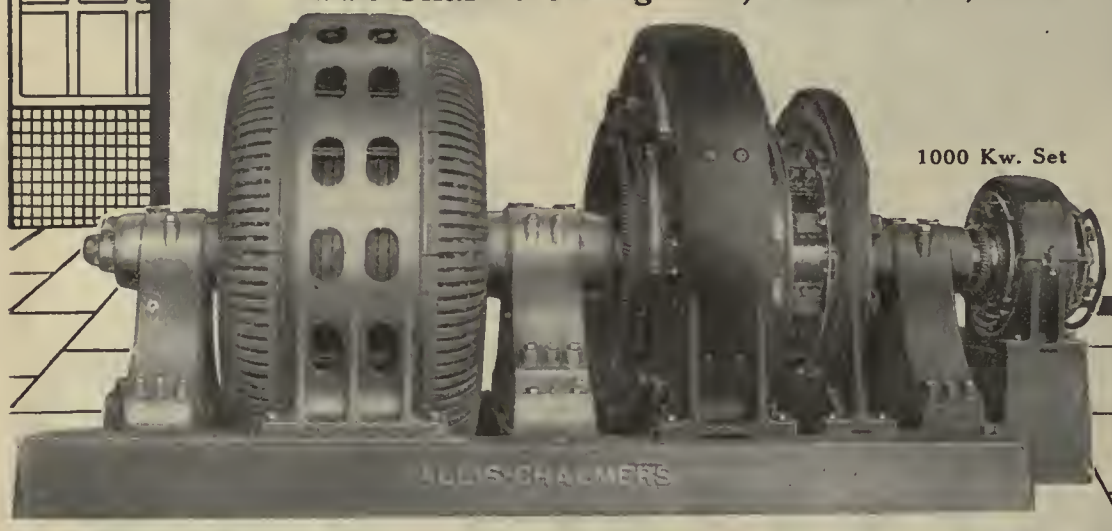
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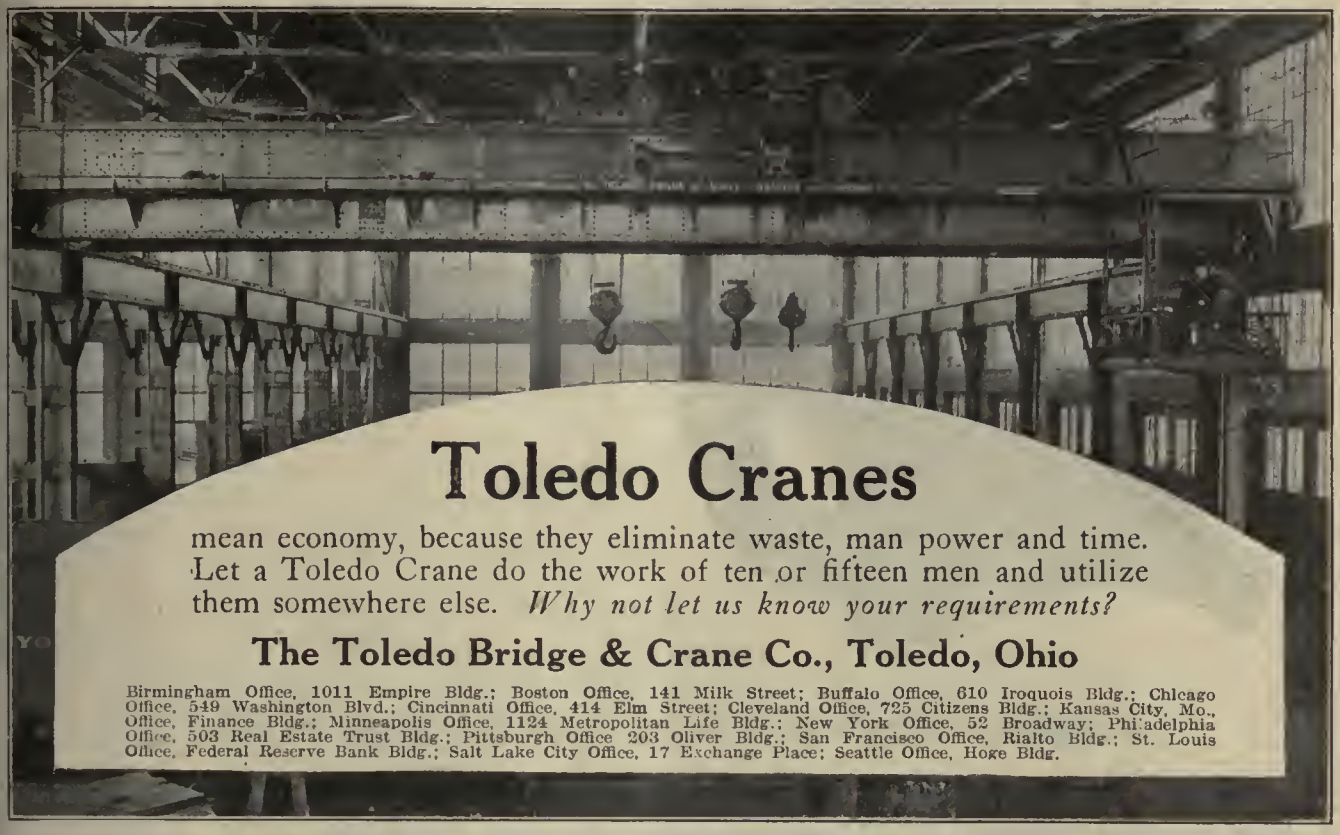
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mean economy, because they eliminate waste, man power and time. Let a Toledo Crane do the work of ten or fifteen men and utilize them somewhere else. *Why not let us know your requirements?*

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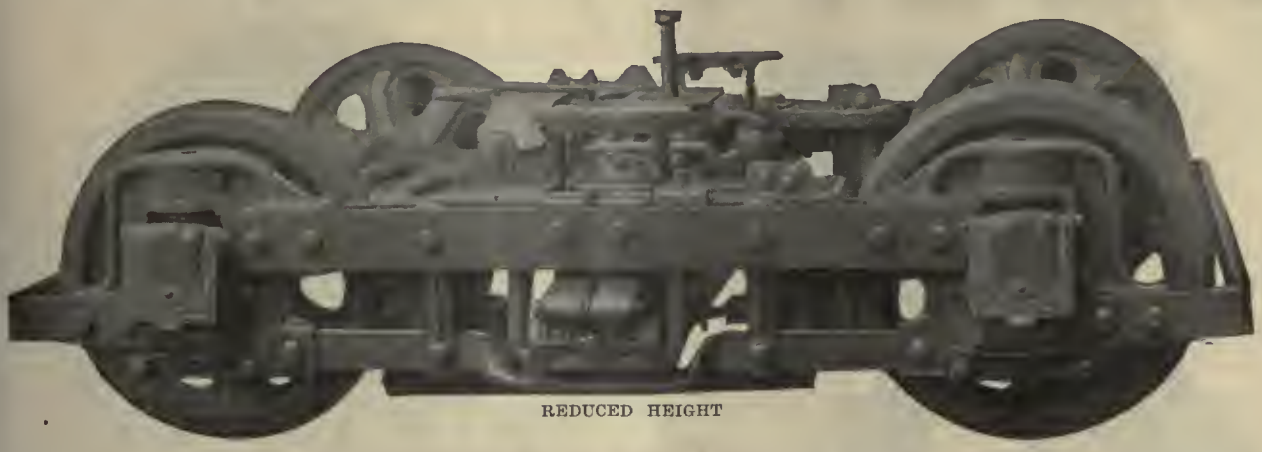
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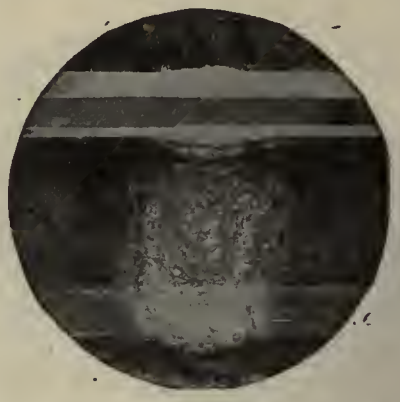
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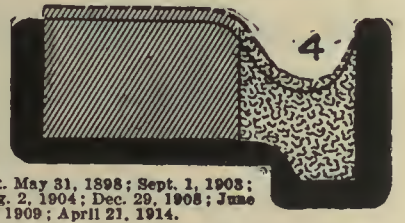
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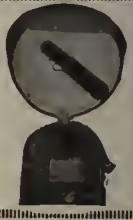
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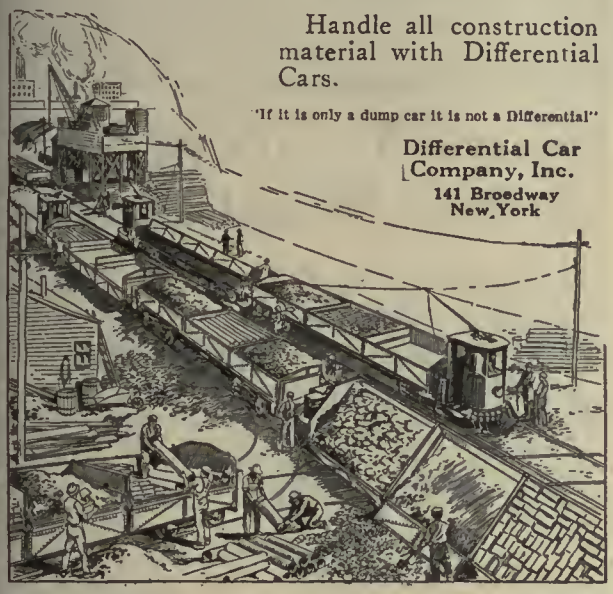
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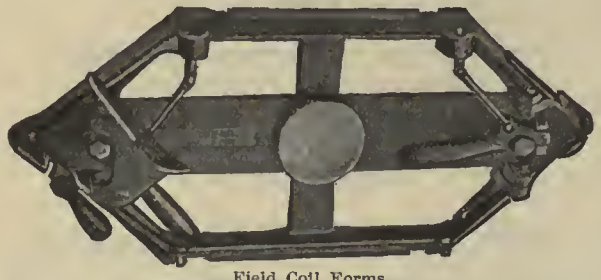
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for

Railroads - Contractors - Industries
Automobiles - Pole Pulling and Ordnance

Templeton, Kenly & Co., Ltd.

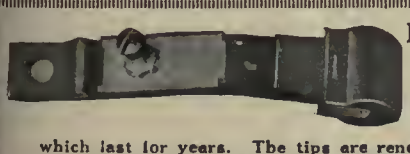
Established 1892

London Chicago Paris

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



Russell Mfg. Co.

Makers of

Triggerlock Reversible Controller Fingers

which last for years. The tips are renewable and reversible

U. S. Factory: 814-18 Bath Avenue, Niagara Falls, N. Y.

Canadian Factory: 557 King St., West, Toronto, Canada

M-R INSULATION MFG CO

"Everything in Insulation"

Mica	Waxes
Vulcanized Fibre	Asphalts
Varnished Cloth	Compounds
Insulating Tapes	Insulating Varnish

The above are only a few of our products
Write us for anything in this line you may require.

MITCHELL-RAND M'F'G CO.

103 John St., New York City



TROLLEY Catchers and Trolley Retrievers made by C. I. Earll, York, Pa., are well designed, well built, simple and effective. They are easy to operate and maintain.

Send for sample and try them out

C. I. EARLL, York, Pa.



The Zone System of Fares is successfully collected with the aid of Cleveland Fare Boxes.

Let us give you particulars.

The Cleveland Fare Box Company

Cleveland, Ohio

Canadian Branch: Preston, Ontario

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

Gold Car Heating & Lighting Co., 17 Battery Pl., New York

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



THE STAR BRASS WORKS

KALAMAZOO, MICH., U. S. A.

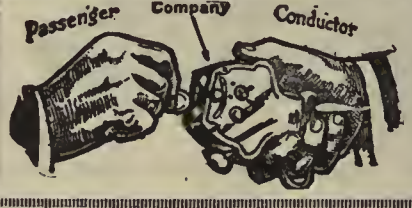
"It Behooves You to Hooverize Your Motormen"

We can help you

Write to

The Arthur Power-Saving Recorder Co.

2nd National Bank Bldg., New Haven, Conn.



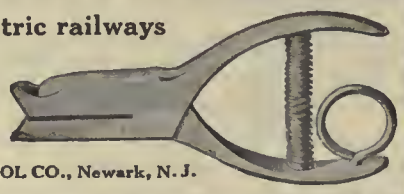
Direct Automatic Registration By the Passenger

Rooke Automatic Register Co.

Providence, R. I.

75% of the electric railways use

B-V Punches



Send for Catalog.

BONNEY-VEHSLAGE TOOL CO., Newark, N. J.



Use them in your terminals—

PEREY TURNSTILES or PASSIMETERS

Faster than the ticket seller

Perey Manufacturing Co., Inc.

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Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company

Carlisle, Pa.

THE MOST SUCCESSFUL MEN IN THE ELECTRIC RAILWAY INDUSTRY READ THE ELECTRIC RAILWAY JOURNAL EVERY WEEK







PERLEY A. THOMAS CAR WORKS

Manufacturer of Cars and Car Materials

Cars of all types from one-man to large interurban

HIGH POINT, N. C.

SASHES, DOORS
INTERIOR FINISH
VESTIBULES AND FRAMING

CURTAINS, VENTILATORS
SASH AND DOOR TRIMMINGS
DOOR AND STEP MECHANISM

B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; Harold A. Hegeman, Vice-President and Treasurer; Fred C. J. Dell, Secretary; W. C. Lincoln, Manager Sales and Engineering.

National Railway Appliance Co.

50 East 42nd St., NEW YORK CITY

Hegeman-Castle Corporation, McCormick Bldg., Chicago Ill.
National Railway Appliance Co., Munsey Bldg., Washington, D. C.
National Railway Appliance Co., Little Bldg., Boston, Mass.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions, Anderson Slack Adjusters, Genesee Paint Oils, Clapp's Fire Resisting Paint, Dunham Hopper Door Device, Fensible Drop Brake Staffs, Anglo-American Varnishes, Paints, Enamels, Surfaces, Shop Cleaner, Johnson Fare Boxes, Drew Line Material and Railway Specialties, Perry Side Bearings, Miller Trolley Shoes, Hartman Centering Center Plates, Economy Power Saving Meters, H. and W. Electric Heaters, Garland Ventilators, Pitt Sanders, National Safety Car Equipment Co.'s One-Man Safety Cars.



The "Hycap-Exide" Battery

for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO.
PHILADELPHIA

USG
CARBON—GRAPHITE—METAL BRUSHES

For Car and Power House Units

MEXICAN GRAPHITE CURVE GREASE
For Gears of Electric Cars
MEXICAN GRAPHITE JOURNAL AND GEAR GREASE
MEXICAN GRAPHITED WOOD GREASE

Literature and detailed information sent upon request

The United States Graphite Co.

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Branch Offices:
New York, Chicago, Philadelphia, St. Louis, Pittsburgh, Denver, Birmingham, San Francisco

Largest Miners of Graphite on This Continent

Railroad and Tram Car Specialties

New inventions developed, perfected and worked for the English market

Messrs. G. D. Peters & Co., Ltd.

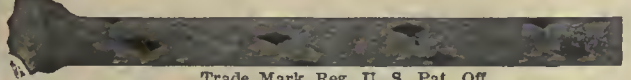
Windsor Works, Slough (Bucks), Eng.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

Bound Brook Trolley Wheel Bushings Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY
Bound brook, New Jersey *Detroit Office: 1723 Ford Bldg.*

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

ARMATURE winder wanted on railway motor and compressor armatures; experience on bar wound as well as coil wound armature desirable; good wages; location Middle West. P-709, Elec. Ry. Journ., Old Colony Bldg., Chicago.

COMPETENT engineer wanted with experience in design of overhead line material for direct suspension and catenary line construction. State age, experience, salary and when available. P-718, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

COMPETENT master mechanic wanted for City property in Middle West. P-702, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

COMPETENT master mechanic wanted by street railway in Central West operating 70 cars; considerable portion of equipment light weight safety type; state age, previous experience, and salary desired; all replies will be considered strictly confidential. P-710, Elec. Ry. Journ., Old Colony Bldg., Chicago.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West; state experience, references, and salary desired when replying. P-605, Elec. Ry. Journal, Old Colony Bldg., Chicago.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

FIRST class street car mechanic wanted, one experienced with mechanical and electrical equipment of street cars. Address Corpus Christi Railway & Light Company, Corpus Christi, Texas.

POSITIONS VACANT

ONE first-class armature room foreman wanted for a shop employing about thirty people. Must be familiar with all types railway armatures. State experience and salary desired. P-706, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

PERMANENT employment for first class draftsman, familiar with electric and steam railway special work, with manufacturing concern near New York City; state full experience and salary desired. P-713, Elec. Ry. Journ.

UTILITY company in West Indies desires services of young aggressive superintendent of street railway system; must have had similar experience elsewhere; be able to handle men and get along with labor; obtain efficient results; train employees and give the public efficient service. System operates 50 cars and 20 miles of track; only man of aggressive and efficient personality need apply. Give full particulars of past expereince, photo and reference. P-707, Elec. Ry. Journal.

POSITIONS WANTED

A CHANGE of position is desired by a young man experienced in street railway shop work; now engaged as assistant to superintendent of equipment. PW-715, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CAPABLE technical man of proven executive ability, now employed, seeks opportunity in responsible position with a property where initiative and dependability are valued; 14 years' experience electric railway field; 10 years responsible charge of work; thoroughly competent in the design, maintenance and operation of equipment; successfully handled labor; experienced in making reports on traffic and methods of effecting operating economies. PW-708, Elec. Ry. Jornal, Old Colony Bldg., Chicago.

POSITIONS WANTED

CLAIM agent 40 years old, active and full of life, long experience, desires to make change; expert shorthand writer, obtaining most thorough information investigating accidents, from both injured and witnesses; motormen and conductors most carefully instructed; fine record on low settlements; take own photos of accidents; thorough and up-to-date office system installed; excellent references. PW-694, Elec. Ry. Journal.

ENGINEER with broad experience desires position in constructing, maintaining, rehabilitating and appraising electric street and interurban railways. PW-711, Elec. Ry. Journ., Old Colony Bldg., Chicago.

EXECUTIVE open for engagement, experienced in management and operation of railway and electric properties; thoroughly conversant with accounting, purchasing, finance, public policies, rates, design and construction; references furnished if desired. PW-717, Elec. Ry. Journ., Old Colony Bldg., Chicago.

FOREMAN — Experienced in overhauling and maintenance of rolling stock, motors, etc.; handle men to advantage; best references. PW-712, Elec. Ry. Journ.

MAN, age 35, 16 years' experience in transportation departments as platform employee, inspector, instructor, dispatcher and assistant superintendent. Good schedule man. At present employed on property operating 90 cars. Will accept position offering advancement. PW-703, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

MAN, with 15 years' experience as general foreman and superintendent in street railway and lighting construction, is open for good proposition; can produce results. PW-716, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

WANTED

G-E.—1000, 67-tooth

GEARS

not over 4-in. bore. New or second hand.

W714—Electric Railway Journal
Rialto Bldg., San Francisco, Calif.

MOTORS WANTED

1—Quadruple set of motors, comparatively modern type, and should be 100-hp. or better, 550 to 650 volts D.C. Spot cash or will exchange 4 G. E. No. 74 motors which are not heavy enough for our work.

Rochester & Syracuse Railroad Co., Inc.
J. H. Hickey, Purchasing Agent
500 Syracuse Savings Bank Bldg., Syracuse, N. Y.

ELECTRICAL UNIT BARGAIN

Westinghouse 400 kw. Generator, 3-phase, 25-cycles, A.C., 220 volts, 136 r.p.m., serial 201925, with flywheel 11 in. x 14 ft., direct connected to cross compound Brown, heavy duty Corliss engine, 18 in. diameter piston by 36-in. stroke.

The above is in first-class second-hand condition.

For further information apply

J. P. NOONAN

816 Union Arcade Bldg., Pittsburgh, Pa.

POSITIONS WANTED

SUPERINTENDENT, 17 years' experience in transportation, traffic and mechanical, on road operating in eastern Ohio. A-1 references, executive ability, competent to assume full charge; can get results. Address PW-639, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT. Fully qualified in all departments; many years' experience in single track, high-speed, and city operation. Successful in handling labor and maintaining discipline. Now employed but desirous of bettering prospects. Requests the attention of presidents or managers having vacancies or contemplating changes. Excellent references from past and present employers. PW-638, Elec. Ry. Journal.

THOROUGHLY competent operating executive, now manager of small property, desires an opportunity to assume greater responsibilities, with better prospects for the future. Fully qualified in all departments. Most excellent references from present and past employers. Correspondence solicited. PW-637, Elec. Ry. Journal.

Caution—RAIL USERS

BUY NOW. There is a SCARCITY. We offer the following NEW RAILS for prompt shipment:

New 12-lb. and 30-lb. rails, splices, bolts and nuts.

New 90-lb. rails, angle bars, bolts, nuts and spikes.

They will be gone soon. Write or wire for our quotations.

Wire—300,000 lb. or more of copper trolley, feeder, high tension, etc.

A number of steel bridges on line of Cincinnati & Columbus Traction Co. For quick acceptance at $1.00 per 100 lb. as is. Photographs on request.

HYMAN-MICHAELS COMPANY

531 Peoples Gas Bldg., Chicago

BRANCH OFFICES: First National Bank Bldg., Pittsburgh, Pa.; Railway Exchange Bldg., St. Louis, Mo.; East Chicago, Ind.; New York: Woolworth Bldg.
YARDS AND WAREHOUSES: East Chicago, Ind. and St. Louis, Mo.

IMMEDIATE DELIVERY

Twenty-Five Cycle Rotary Converters

2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380-volts.
1—250-kw., 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380 volts.

Street Railway Motors

20—G.E. 800-volts with Form K Controllers.

All in Splendid Condition

JOSEPH MYERSON, 411 Atlantic Ave., Boston 9, Mass.

New—Used—Rebuilt
MACHINERY AND SUPPLIES
for construction and industrial work.
READING ENGINEERING CO., INC.
154 Nassau St., New York

CARS FOR SALE

2—McKesn Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.
Get Our List and Prices.
J F. DONAHOO CO., Birmingham, Ala.

WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment; from stock material, of coils commutators—shafts—bearings, etc. Remember our Initials stand for our product.

CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918



Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

FOR SALE

6—50-FT.

Interurban Cars

Complete

Mounted on Standard C-60-P Trucks; 4 West. No. 56 Motors.

Electric Equipment Co.
Philadelphia, Pa.

STREET CARS

3—32-ft., 4-ft. 8½-in. ga. closed motor cars; seating capacity 32, Symington-Baldwin trucks. First Class. Will convert to one man operation if desired.
4—22-ft., 4-ft. 8½-in. ga., open trailers; seating capacity 35. Taylor McGuire trucks. Good.

ZELNICKER IN ST. LOUIS

For a list of hundreds of other unusual bargains in Rails, Railway and Industrial Machinery and Equipment write for Our Latest General Bulletin.

MAC GOVERN & COMPANY INCORPORATED POWER MACHINERY

Prompt Shipment From Stock

2—Brill double truck combination passenger and baggage cars, 38 ft. long overall, passenger compartment 19 ft. 6 in. long, baggage compartment 8 ft. 7 in. long, equipped with four No. 101-B Westinghouse motor equipment complete.
1—Work car, equipped with two No. 49 Westinghouse motors complete.
40,000 lbs. No. 4/0 grooved trolley wire.
8 miles of 350,000 c.m. stranded, weatherproof cable.
3 miles of No. 4/0 weatherproof insulated wire.
27 miles of No. 4 hard drawn copper wire.

MacGovern & Company, Inc.
114 Liberty Street, New York, N. Y.

BRANCH OFFICES:
Pittsburgh, Pa., 498 Union Arcade Bldg.
Seattle, Wash., L. C. Smith Bldg.
Montreal, Que., 285 Beaver Hall Hill

RAILS IN STOCK

IMMEDIATE SHIPMENT

GUARANTEED

10,000 Tons New 12-lb. to 100-lb., and fastenings
40,000 Tons New Open-hearth, first quality, 80 lb.
5,000 Tons Relayers, 25 to 100 lb., and fastenings.
Car and less carload inquiries and orders solicited.
Rails cut to lengths for all purposes.

TRACK ACCESSORIES
BOLTS, NUTS AND SPIKES

We Manufacture

FROGS, SWITCHES, CROSSINGS, PORTABLE TRACK, DUMP CARS, PLATFORM CARS, ETC.

L. B. FOSTER COMPANY

Park Building
Pittsburgh, Pa.

Tribune Building, 154 Nassau St.
New York, N. Y.

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

FREQUENCY CHANGER SETS

1—600 kva., Allis-Chalmers Frequency Changer Set, 300 r.p.m., 3-phase, 60-cycle, 2300-v. one end, 3-phase, 6600-v., 25-cycle on other end.
1—400 kw., G. E., 3-phase, 25-cycle, 6000-v. one side—2400-v., 2-phase, 60-cycle other side—375 r.p.m.

ARCHER & BALDWIN, INC.
114-118 Liberty Street, New York City
Telephone 4337-4338 Rector

Advertisements for the

Searchlight Section



Can be received at the New York Office of Electric Railway Journal until 10 a.m.

Thursday

For Issue out Saturday

0141

"Had 5 answers to the first issue"

So the Selma Electric Railway Co., Selma, Ala., wrote us in regard to their recent ad. in the

SEARCHLIGHT SECTION

of

Electric Railway Journal

"SEARCHLIGHT" ads are Opportunity ads. They are watched carefully each week by the whole electric railway field.

"SEARCHLIGHT" ads cost little and invariably bring prompt returns.

For Every Business Want
"Think SEARCHLIGHT First"

0133

NEW

80 lb. RAIL & ACCESSORIES

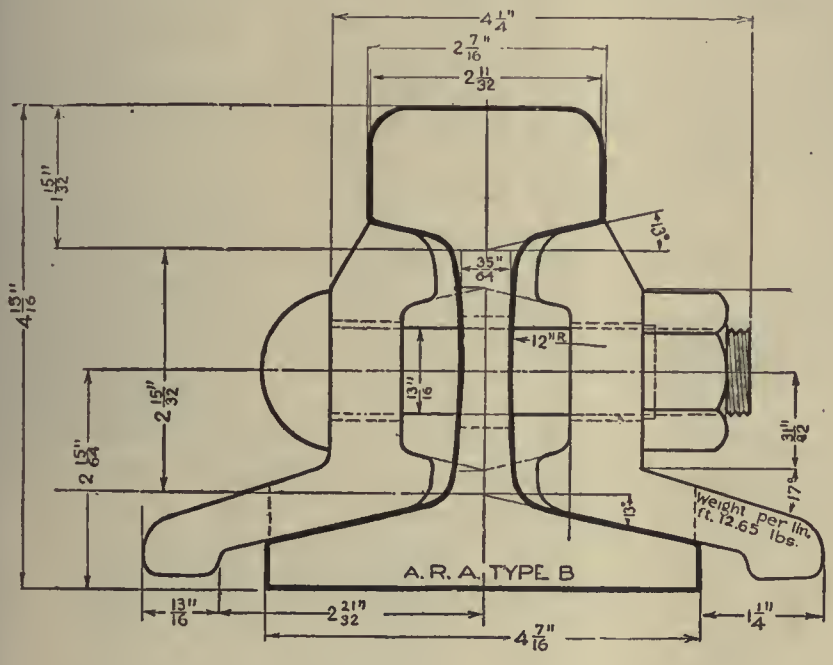
ANGLE BARS, SPIKES, BOLTS AND NUTS COMPLETE

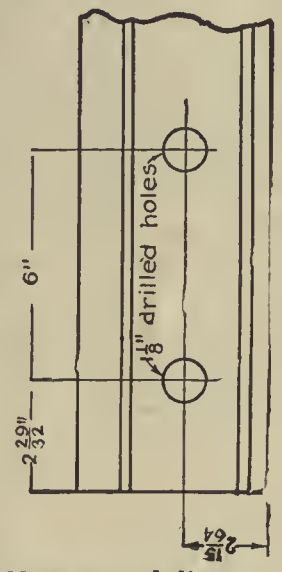
For Sale

A.R.A. "TYPE B" RAIL

Approximately 50,000 gross tons—drilled—standard lengths

Stored at Norfolk, Va. and Kearney, N. J.





Note actual dimensions of rail stated hereon.

HYMAN-MICHAELS COMPANY

Peoples Gas Building, Chicago, Ill.

New York Office
1324-1326 Woolworth Building

Pittsburgh Office
1312 First National Bank Building

St. Louis Office
2115 Railway Exchange Building

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers
Ingersoll-Rand Co.

Air Aftercoolers
Ingersoll-Rand Co.

Ammeters
Weston Elec'l Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Angle Bars
Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobile and Buses
Brill Co., The J. G.
White Co., The

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones B. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Bankers & Brokers
Coal & Iron National Bank

Batteries, Dry
National Carbon Co.

Batteries, Storage
Electric Storage Battery Co.
National Carbon Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brady Brass Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Watson-Stillman Co.
Zelnicker, Walter A., Supply Co. Inc.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Creaghead Eng. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Railway Appliance Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Ackley Brake & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Traction Brake Co.

Bricks, Fire
Green Engineering Co.

Bridges and Buildings
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morganite Brush Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
United States Graphite Co.

Brushes, Motor and Generator
National Carbon Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Buckets
Blaw-Knox Co.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.

Bushings, Graphite & Wooden
Bound Brook Oilless Bearing Co.

Cables. (See Wires and Cables)

Carbon Brushes. (See Brushes, Carbon)

Carbons, Photographic and Projector
National Carbon Co.

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
Osgood Bradley Car Co.
Thomas, Percy A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

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Electric Storage Battery Co.
General Electric Co.

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Ajax Metal Co.
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Eureka Co.
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American Steel Foundries
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Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.
Wharton, Jr. & Co., Inc., Wm.

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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Wood Co., Chas. N.

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Pantasote Co.

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Industrial Protective Co.

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Bossert & Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Matthias
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

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Columbia M. W. & M. I. Co.
Diamond Mfg. Co.
Electric Service Supplies Co.

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Cleveland Armature Works
Columbia M. W. & M. I. Co.
Diamond Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Comelong
Bush Electric Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
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Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. B. Co

Compressors, Gas
Ingersoll-Rand Co.

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Blaw-Knox Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Chicago Fuse Mfg. Co.

Conduits, Underground
Standard Underground Cable Co.

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Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

Controller Fingers
Eureka Co.
Russell Mfg. Co.

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Eureka Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Electric Service Supplies Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Portable Machinery Co.

Conveyors, Coal & Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

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Columbia M. W. & M. I. Co.
Green Engrg. Co.

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Anaconda Copper Mining Co.
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Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

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Niles-Bement-Pond Co.
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Crossing Foundations
International Steel Tie Co.

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Crossing Signals. (See Signals, Crossing)

Crossings, Track. (See Track, Special Work)

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Allis-Chalmers Mfg. Co.

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Jacobs & Co., J. L.
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Eureka Co.
General Electric Co.
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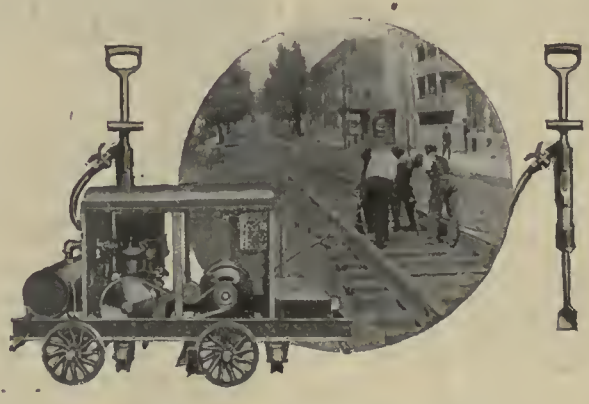


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Westinghouse Elec. & Mfg. Co.

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Columbia M. W. & M. I. Co.
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St. Louis Car Co.

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Brill Co., The J. G.

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Peters & Co., G. D.
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Electric Service Supplies Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

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Nachod Signal Co., Inc.
U. S. Electric Signal Co.

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Drew Electric & Mfg. Co.
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More-Jones Brass & Metal Co.
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Standard Steel Works Co.
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St. Louis Car Co.

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American Mason Safety Tread Co.
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Irving Iron Wks.

Steps, Safety
Irving Iron Wks.

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Babcock & Wilcox Co.
Green Engrg. Co.
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Copper Clad Steel Co.
Roebling's Sons Co., J. A.

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Structural Steel
Lackawanna Steel Co.

Subway Grating
Irving Iron Wks.

Superheaters
Babcock & Wilcox Co.
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Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)

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Switch Stands
Indianapolis Switch & Frog Co.
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Mr. Hurley said:

"When I was Chairman of the Federal Trade Commission, I made it a point to have the principal trade papers in the United States sent to me regularly. These were read not only by myself, but by the entire staff, so that we might have a finger on the pulse of the country's industry.

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Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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Eliminate Accidents

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cars and station steps.

Universal Safety Tread Company

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Columbia Pyramid Brushes for Street Car Motors

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THERE is one *best* type of Columbia Pyramid Brush for *your* motors. Let us put on exactly the brush you need.

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Trolley poles (steel) and wheels

Gw-Hill Company, Inc. August 14, 1920 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

DISKO METAL INSERTED MATTING



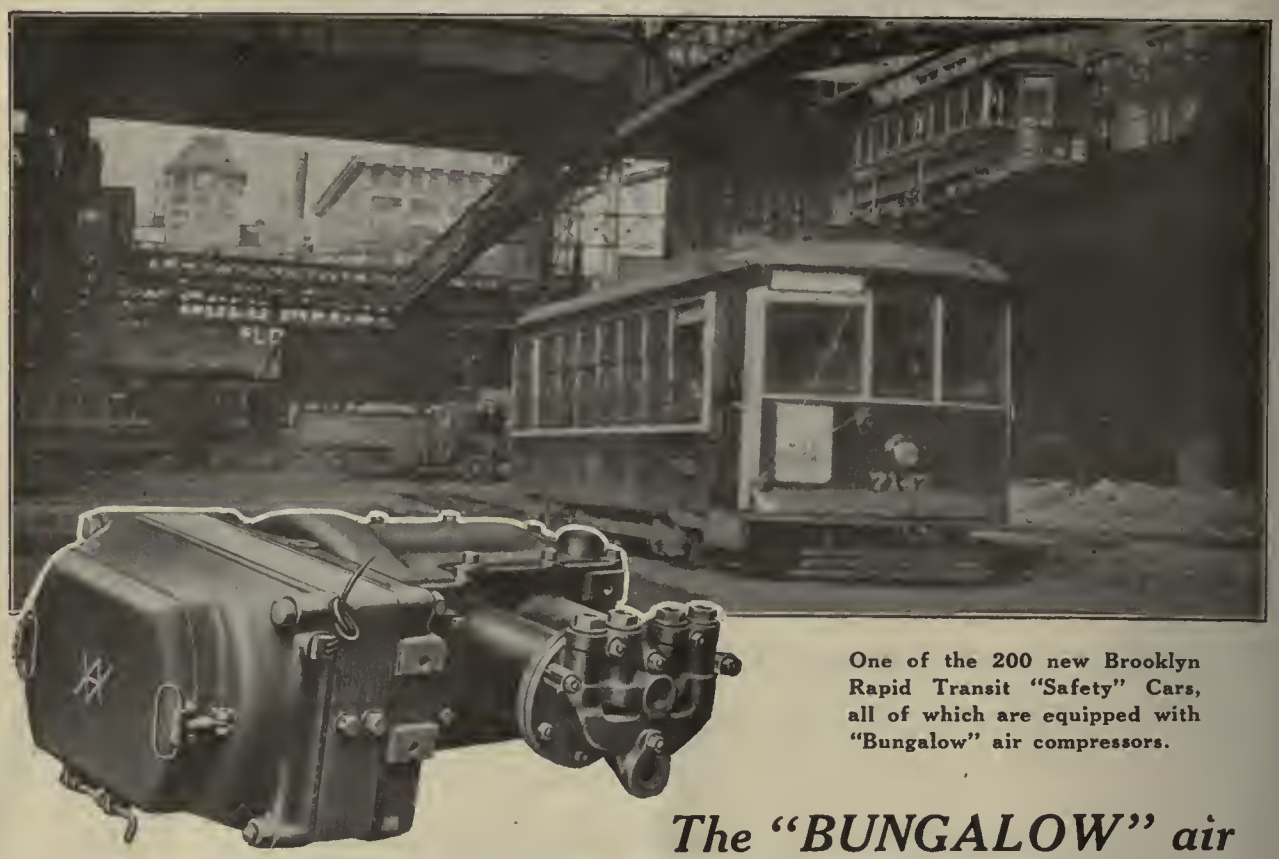
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Disko Matting is made in treads to fit all car steps. The small metal discs embedded in the surface of the diamond-shaped rubber knobs provide extreme durability and prevent slipping.

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"Bungalow" type air compressor

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From the big metropolitan cities, where the greatest density of street car traffic exists, comes the most urgent call for air brake equipment that will give reliable service and insure freedom from traffic tie-ups and delays.

Such is Brooklyn, N. Y., for whose busy surface lines the Brooklyn Rapid Transit Company recently selected "Bungalow" air compressors for its entire number of 200 new "Safety" cars.

Over 3252 "Safety" cars now running on 182 different electric lines throughout the United States, are equipped with "Bungalow" compressors.

Brake Building Our Business for a Lifetime

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New York
San Francisco
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are double-truck

which is the type previously used in this service. The weight of the one-man cars is 14,500 lb. as against 31,000 lb. for the closed cars, and the one-man cars seat thirty-four passengers to thirty for the other type. The one-man cars thus have less than half the weight per seated passenger of the cars of the older type.

Previously the service was operated with a seven-and-one-half-minute interval during rush hours and a ten-minute interval during non-rush hours. With the introduction of one-man cars this has been reduced so now a three-and-one-half-minute interval is maintained during rush hours and a five-minute interval at other times. This increase in service should result in an additional increase in the number of passengers carried, as many who previously walked the short distance to and from the terminal rather than wait a few minutes for a car will now take to riding with the short headway. A complete trip in one direction requires twelve minutes and there is a three-minute layover at each end of the trip. This is sufficient for the operator to change ends, move the fare box, take register readings, and fill out his record cards for the trip. With the present service an average load during rush hours consists of from thirty-five to forty-five passengers, and during non-rush hours from eight to twelve is an average load. The wages for the operators of the one-man cars have been increased 5 cents per hour over the rate which they previously received as motormen. This increase in rates makes the work popular so that the most efficient motormen are anxious to operate these cars. The cars are equipped with the full complement of the now-familiar safety devices.

Saves Over ½ the Weight

Increases Service 100%

Saves Fatiguing Labor

Attracts the Most Efficient Motormen

The Safety Car

It does all these things and many others, too. It reduces operating expenses and provides all-around safety to passengers.

Many roads, especially in the large cities, do not believe the safety car practical for their service. The majority of these roads are using safety cars today. They had to be convinced that these cars could make good under heavy as well as light traffic conditions.

That is why we want to make a study of your system. We want to convince you that YOU can benefit by the many advantages of the safety car.

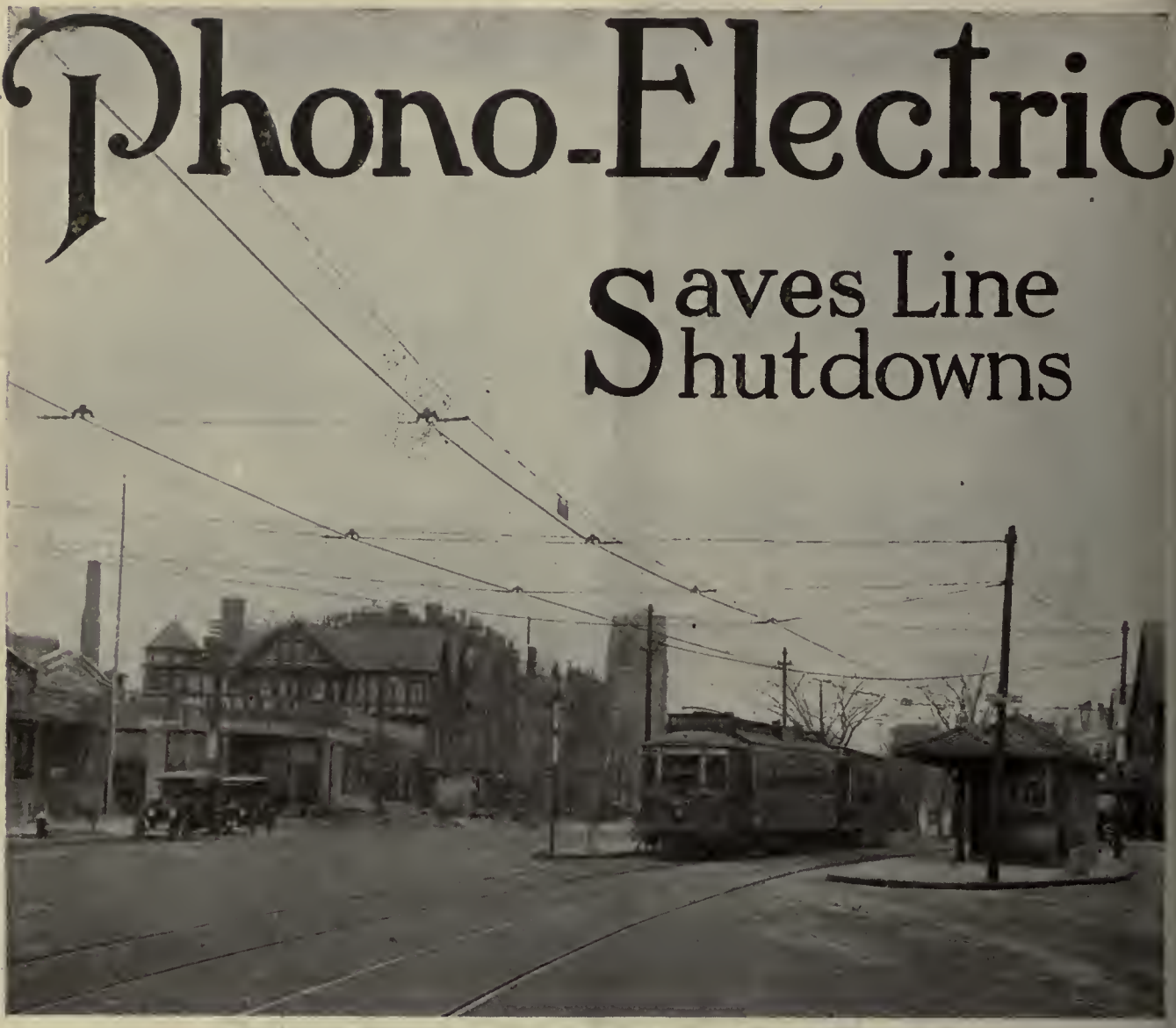
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Phono-Electric

Saves Line Shutdowns



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Phono-Electric is put up to stay up.

Bridgeport Brass Company
Bridgeport Connecticut

2195

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FROM COAST TO COAST



East, West, North and South, all the way between, Safety Cars are saving money and building business for progressive railways.

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The fact that many of these cars carry O-B Material is logical. The railway operator knew the ground there.

Illustrated is a typical safety car operated by the Trenton & Mercer County Traction Co. It has O-B Catchers, Sanders and Imperial Headlights.

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New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles

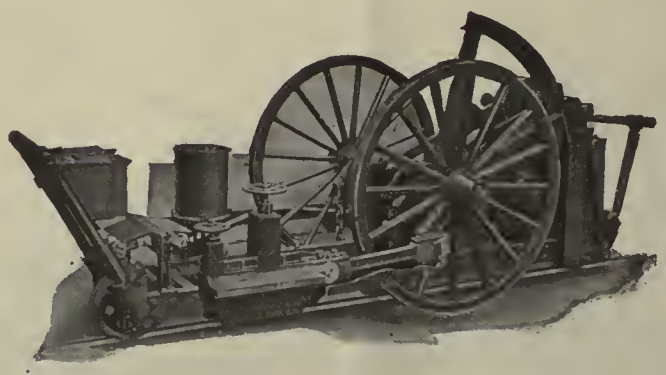
Manufactures: Trolley Materials, Rail Bonds, Car Equipment, High Tension Insulators, Third Rail Insulators.

Have No Fear of Rail Corrugation

The Atlas Rail Grinder

is low in first cost and maintenance. It is just the machine for removing surplus metal used in filling up low joints by arc welding.

Grind it out with



The Universal Rotary Track Grinder

is built along the lines of the Atlas Rail Grinder but has several additional features of advantage and improvement, justifying the slight additional first cost.

The Reciprocating Track Grinder

Rail corrugation, that mysterious bugaboo and arch enemy who is always making his appearance in girder rails at places where he is least expected, can be eliminated completely and entirely, slowly but surely, by a single application of the Reciprocating Track Grinder in any spot where he appears.

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There are other features—but the main point is economy

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Economy of materials because all the concrete in the track foundation takes its share of the load through the three foot by thirteen inch bearing plates.

Economy of labor because of the simple taper jaw rail clip and the elimination of gauging and excessive surfacing.

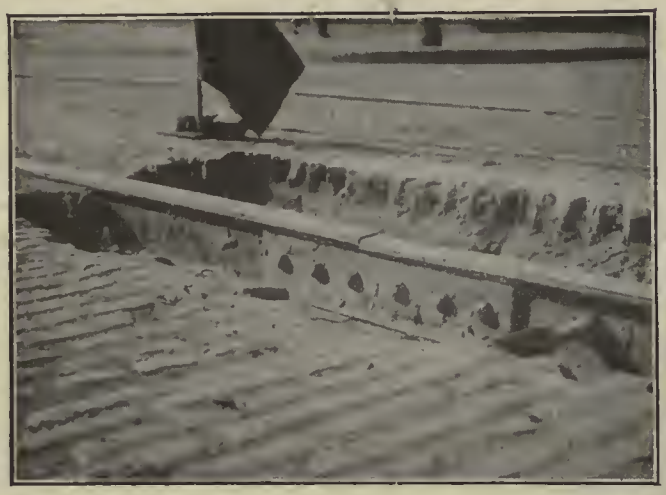
The eleven years of facts behind Steel Twin Tie Track make an imposing collection of data. But they may be boiled down to two words: Permanence and Economy, the two essentials of good engineering.

Steel Twin Tie Track

THE INTERNATIONAL STEEL TIE CO. Cleveland, Ohio

Low Joints

The Disease



bring out the defects in car wheels and cause an uncomfortable jar which grates on the nerves of your passengers.

Eliminate

low joints on your property by the use of Indianapolis Apex Welded Joints.

Pay-as-you Save

$600 will equip your road with an Indianapolis Portable Patented Electric Welder, complete and ready to operate, including Trolley connections, Welding, cables, handles, electrode holders and helmets.

Applied with this and one man



The Cure



"Apex" Joint
for Guard and Girder Rail

Once installed, low joints will disappear at the rate of one every forty minutes and at a ridiculously low cost per joint.

Your saving will pay for the entire equipment in 60 days.

This has given the Indianapolis Electric Welder the well-earned reputation of being "The Greatest Aid to the Way Engineer."

Indianapolis Switch & Frog Co.
Springfield, Ohio

These Keystone Specialties are Standard Equipment on nearly all Safety Cars.



Golden Glow Headlights



Keystone Rotary Gongs



Keystone Air Sanders



Keystone Trolley Catchers



Faraday Car Signal Systems



Keystone Steel Gear Cases



Keystone-Hunter Destination Signs

Always specify them for they will serve you well. Write for bulletin No. 167, showing many other Keystone specialties for use on safety cars.

Faraday Car Signal Systems



Years ago, it would have been folly to tell you that a car signal system by which the passengers could signal motormen to stop, was necessary to efficient, speedy operation of railway cars.

But today people generally do not like the former method of calling to the motorman or eyeing the conductor. Nor can they be expected to rush madly through the crowded rush-hour cars in an effort to advise the motorman that they have reached their destination.

These traits, characteristic of human nature, have to be dealt with to make the service good in the mind of the public and therefore the broad use of Faraday Car Signal Systems. Time-tried and fool-proof and standard equipment on nearly every Safety Car and thousands of other cars.

Very complete data on request.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA 17th and Cambria Streets

NEW YORK 50 Church St.

CHICAGO *Monadnock Building*

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto



CHAPTER FOURTEEN

THE ALL-*BUT* PERFECT STATE

The Sage's Ways re Wages Raise

The All-But Perfect State has received a body blow.

Supposing we had written here a chapter stating that 10,000 men on a road were to receive automatically a 7½ cents an hour wage increase.

—and the operating company couldn't raise the funds to pay the raise,

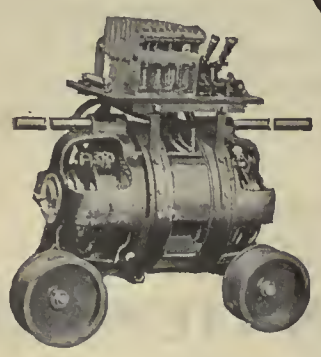
—and the men met and said that the G.M. was doing the best he could and would soon find means for getting that money,

—and that in the interim they would refrain from buying Rolls-Royces and continue at the old rate.

Had we written that it would logically be a chapter for the A-B P. S.

But it actually *did* happen in Philadelphia.

If brotherly-love occurrences like this continue to happen there will be no need of a Perfect State for in each case the man instead of waiting will put several dynamotors to work to save the necessary money to meet the wage demands.



READING NUMBER FOURTEEN

Q. And how would the Dynamotor save money enough to count?

A. By welding bonds in such a way as to give return circuit conductivity as good as a solid transmission wire.

By welding rails at a big saving.

By making shop repairs and saving equipment.

—and you'd be surprised to see what immense figures it amounts to.

We have the figures if you want to check them.

Rail Welding and Bonding Company

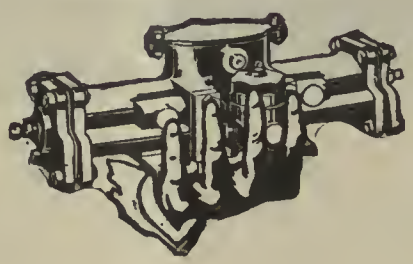
Formerly The Lincoln Bonding Co.



Cleveland, Ohio.

Get More Capacity On Saturated Track

Standardize! *Pneumatize!*



On the track saturated during your peak hours you want the greatest car capacity possible; but you also want the most adaptable, most flexible and most speedy cars, whether they are to be run singly or in trains.

NATIONAL PNEUMATIC "RUSHOUR" CAR ENGINEERING is intended to meet that condition so far as the development of the most modern door and step control layouts and equipment permits.

No matter what your present designs of large cars may be like in the way of door and step arrangements, we will work with you to produce those features of speed-up service that will enable your cars to *sprint* instead of run from stop to stop.

These features are obtained through NATIONAL PNEUMATIC Door Engines which leave the platform man free for other duties, Safety Interlocking Door Control and Motorman's Light Signals which eliminate all delay between the closing of the doors and the starting of the car; and Door and Step Operating Mechanisms which respond perfectly to the application of the Pneumatic Door and Step Control—thus aiding the operator to secure the fullest possible capacity of the track and to

Make your peak periods produce maximum profit and efficiency

National Pneumatic Company, Inc.

50 Church St., New York Edison Bldg., Chicago

Works: Rahway, N. J.

Post yourself on improved service resulting from the use of Lackawanna SAFETY-HEAD ANGLE BARS

Most of your fellow track men will acknowledge that broken angle bars make a serious and annoying problem for them, as well as for everybody else responsible for safe track.

You doubtless fully realize the dangers of broken bars, and the desirability of employing any device that will prevent this trouble. We therefore wish to urge you give due consideration to the possibilities of making your rail joints safer. Once you understand and fully appreciate the Lackawanna Safety-head Angle Bar, the effective way in which it avoids the worst causes of angle bar failure, you will at least want to give this device a trial.

One of the first roadmasters to install Lackawanna Safety-head Angle Bars put them into service about six years ago on a section of main line track subjected to exceptionally heavy traffic, and where the breakage of angle bars had become a serious and expensive menace. We are told that in all the time since Lackawanna Safety-head Angle Bars were installed not a single instance of a broken bar has been recorded on this stretch of track.

The use of Lackawanna Safety-head Angle Bars makes for safe long-lived rail joints and does so at a cost that leaves no reason for being satisfied with less efficient construction.

The Principle of the Lackawanna Safety-head Angle Bar consists in depressing the hot metal at the location of the center of the head of the bar to a depth not exceeding ⅛-



Lackawanna Safety-head Angle Bar and detail of the improved safety-head depression which prevents surface wear and cutting underneath the end of the rail head.

The Lackawanna Safety-head Angle Bar is *your own section* made break-proof



inch and for half an inch on each side of the rail ends where they meet. This prevents the sharp under-corners of the rail heads at the ends from cutting or wearing into the bar and impairing the strength of the metal. The sectional area of the bar at the depression is not reduced, nor is the original rolled surface and finish changed in character. The bar therefore retains its full original strength at this most critical point, where with an ordinary angle bar wear is practically certain to develop and cause a dangerous condition.

We also make plain fish plates with center depressions in top and bottom to afford the same advantages.

Let us submit cost and performance data.

For Railroad Construction Work

Lackawanna Steel Sheet Piling

Thousands of tons of Lackawanna Steel Sheet Piling are used by American Railroads for construction and permanent protection of bridge piers, temporary and permanent retaining walls, grade elimination work, etc.

DOUBLE-LOCK LACKAWANNA INTERLOCK

Lackawanna Sections are made in a wide range of types and sizes from which one can be selected for safety and economy under practically any conditions.

The Lackawanna Flexible Interlock is not only superior in strength and water tightness but permits obstructions in the piling line to be passed without undue deflection and is adapted to the construction of irregular walls and small circular enclosures

Our Sheet Piling Engineers will gladly co-operate with railroad construction officials in determining the most desirable methods and sections for difficult work and will submit valuable cost data.

Elcannes Concrete Reinforcing Bars



The broad and deep depressions at regular intervals in the bar surface take the place of excess and waste metal comprising the projections on ordinary types of deformed bars.

The bonding surface of the Elcannes Bar is 15 per cent greater than that of a plain square bar of the same nominal size.

The Elcannes Bar is uniformly designed, the deformations being so arranged on opposite sides of the bar that a practically unvarying cross-sectional area is maintained.

The regular surface and uniform section render handling easy and reduce the difficulty of fabrication or bending in shop or field.

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

499

The General Superintendent of a Northeastern Railway Prefers Armco Culverts

He states in a letter that they have numerous large and small Armco Culverts under the roadbed which have been in the ground from five to twelve years, and have given very good service indeed—all of them being in excellent condition today.

The illustration shows one of the larger culverts. It is five feet in diameter and has only a light fill to protect it from the heavy weight of passing trains. Armco Culverts of Rust-Resisting American Ingot Iron are the preferred culvert for railways and highways.



There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting **ARMCO CULVERTS** and other products of American Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.
Transportation Bldg., Chicago

TRADE MARK
ARMCO
AMERICAN INGOT IRON
RESISTS RUST

Shorter Stops

THE number and length of stops are two factors of prime importance in the cost of car operation. They determine in a measure not only the size of motors but also the energy consumed, the schedule speeds obtained and the number of cars required for a given service.

The duration of stops is determined largely by efficiency in fare collection.

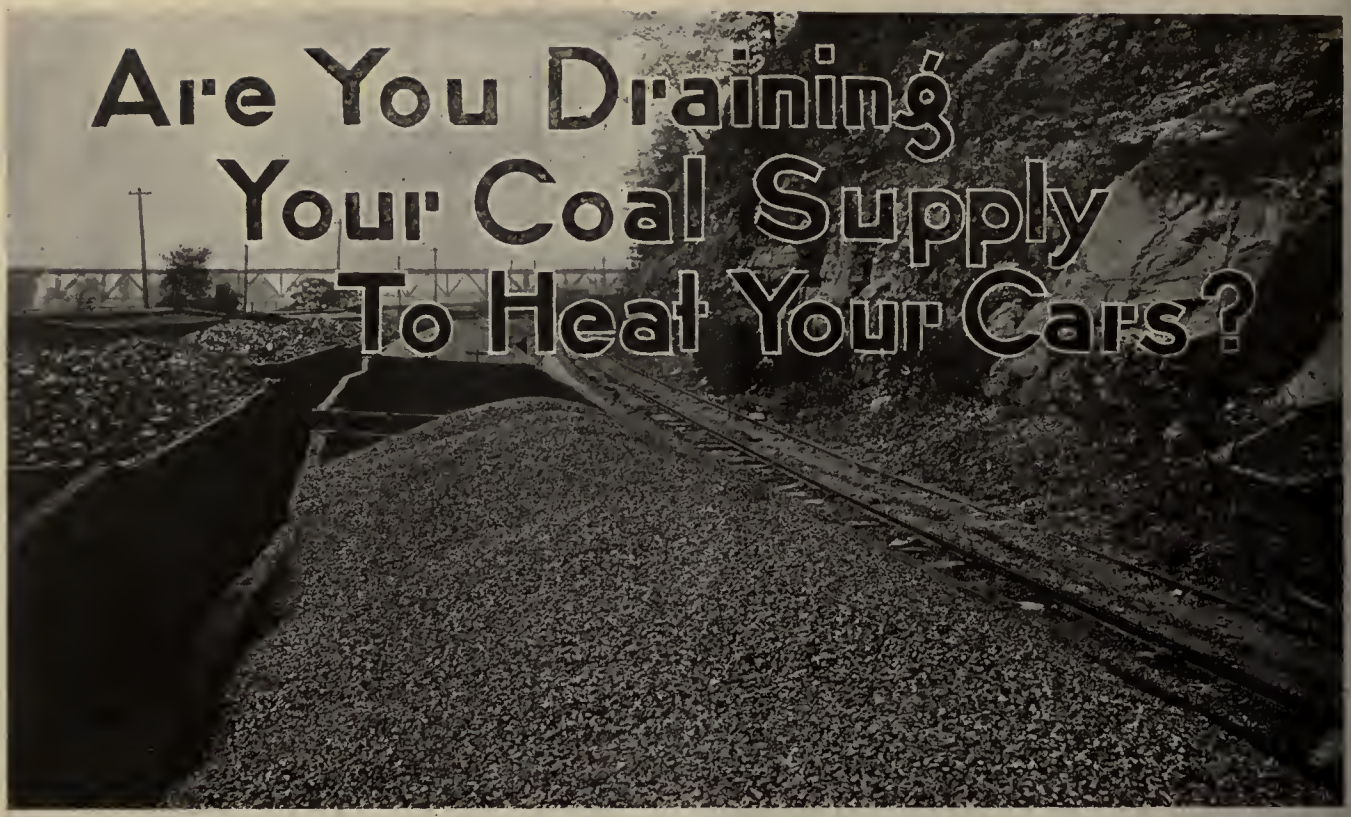
A very little confusion in loading will increase the stop duration 2 or 3 seconds. It doesn't take a very long run to have this delay counted in *minutes* — and this means a decrease in service or the addition of another car.

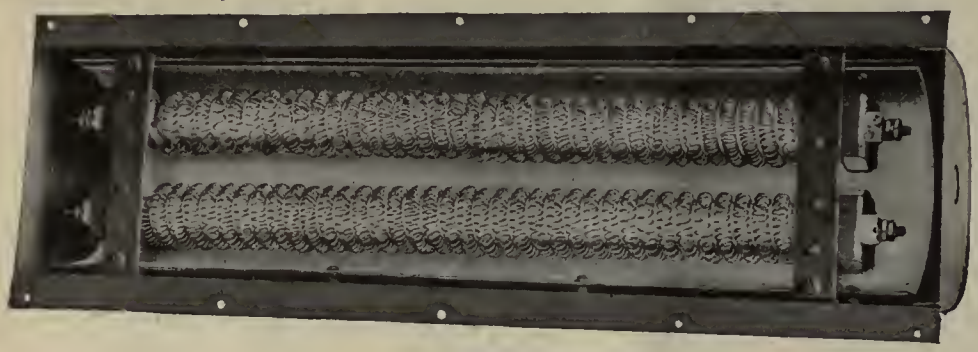
ONE of the contributing causes of delay at stops, and which car design will not improve, is the collection of multiple coin fares.

With the odd cent fares confusion is bound to result unless the unit advantages of the old nickel fare can be retained.

These advantages *can* be retained by the use of metal tickets and Johnson Fare Boxes—and we can prove it by many examples.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.







Consolidated Electric Heaters

with Consolidated Thermostatic Control

will stop the waste—yet give the heat

No need to tell about the high cost of coal and labor—particularly now, when the coal supply is uncertain and labor charges mounting steadily. The economy of ELECTRIC heating as opposed to coal heating is a very great one—Consolidated Car Heaters do not draw heavily on the coal-pile. They allow free, rapid circulation of air on all sides—the heating coils are mounted on porcelain supporting cores, which assume perfect insulation and eliminate vibration.

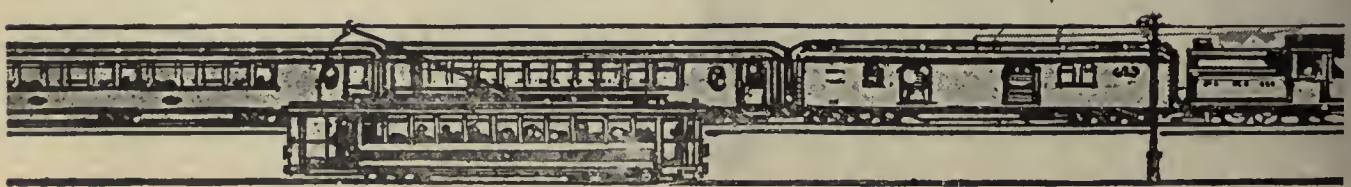
The Thermostatic Control is simple and reliable. It will operate faithfully for years without upkeep expense and pay for itself every year through heat saved.

And the Thermostatic Control *Keeps* the temperature constantly at *exactly* the right point —no more—no less.

Think these things over then get in touch with us.

CONSOLIDATED CAR-HEATING CO.

ALBANY NEW YORK CHICAGO





The history of *Galena Service*, as represented by the master organization of mechanical experts maintained by this company, is one of exceptional accomplishment in effecting efficient and economical operation. Through the personal and practical cooperation of these lubrication specialists, thousands of dollars are saved annually to the traction lines of America, in time, reduction of repair bills and extra mileage attained through the use of the right oil in the right place.

Galena Service does not deal in guesswork or experiment, but demonstrates the successful methods that have been perfected through fifty years of practical experience—methods that are daily proving their value on hundreds of electric railways.

When Galena Service Goes In—
Lubricating Troubles Go Out!

Galena-Signal Oil Company

New York *Franklin, Pa.* *Chicago*

and all principal American cities

LONDON TORONTO BUENOS AIRES MONTREAL PARIS

For an adequate return upon investments electric railways must reduce operating costs to the minimum consistent with safe and efficient operation.



Incandescent Headlights Save Money

The master mechanic of a large railway property stated recently that his incandescent headlights with GECO resistors save his 1oad the wages of at least one man, released for duty elsewhere. This is because incandescent headlights require no expert attention for maintenance or repairs.

Despite this fact, they are highly effective when used with GECO resistors which maintain practically constant current regardless of trolley voltage fluctuations. This low maintenance and absolute reliability, the prime requisites of an efficient headlight, are satisfied by this type of equipment.

GECO Lights Are Always Bright

Ask our nearest office for Bulletin 63800 and the expert advice of our railway specialists

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

35C-55

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 56 New York, Saturday, August 14, 1920 *Number* 7

No Magic in Operation of an Electric Railway by Municipality

THE city fathers of Seattle have found, as they were bound to do, that a nickel is a much smaller coin than they supposed when they contended that it was plenty for a local car ride. They now think that the dime is more appropriate, which it is, in view of the present purchasing power of this coin. Of course in Seattle riders who purchase tickets will be charged a considerably lower fare for the present, but with a base fare of 10 cents the ticket rate can be varied readily to produce the required income. Our conviction is that the present ticket fare of 6¼ cents will not be found adequate. At any rate Seattle has cut loose from the nickel. Recent difficulties in meeting the payroll made the urgency of doing this very apparent.

In Seattle the electric railway department is to be forced to pay its own way. No taxation of the general public for the benefit of the car rider is to be permitted. As the monthly budget for railway operation comes up for consideration by the City Council, the estimate of receipts will appear in close juxtaposition thereto. This is well, for if the ratio of operating cost to income were not kept clearly in view there might be a tendency to give service below cost, at least for a time. Seattle will find, as the railway company in nearby Portland has done, that once the weird spell of the nickel has been broken the fare can be readily adjusted without public resentment. In Portland it was much easier to go from 6 to 8 cents than it was from 5 to 6 cents. Naturally the fare boost in Seattle has given fresh hope to neighboring utilities that are struggling along under the handicap of inadequate income. It will no longer be possible to cite this city as an example of how good management can make ends meet with the nickel.

Research—an Asset to Electric Railways

A RECENT bulletin of the National Research Council contains a list of 300 industrial firms that have research organizations. These firms are engaged in all phases of industry and range from Sears, Roebuck & Company to Stone & Webster and the Detroit Edison Company. If research organizations are not profitable elements of business in a productive sense, then why are their numbers increasing so rapidly?

If a central station, hardware manufactory or mail order house finds a research organization an asset to its business, it seems there might be in the railway industry opportunity—or perhaps we ought to say more opportunity—for such organizations.

The existing personnel of most railways is fully occupied with the direct business of conducting transportation. The number of executives is a minimum in the present precarious condition of the industry and each executive has little time to investigate ideas or equipment that might or might not be successful. Every man has detailed and exacting duties assigned him essential to the routine operation of the system. The superintendent of the power house, shop, carhouses, lines, etc., cannot take time to study details of untried new methods or to make experimental researches in their respective fields.

A research department is the missing element in such an industry, as its duty is to carry out the suggestions of the superintendents and furnish the experimental and engineering skill needed to develop new methods in the industry. The research organization has no executive duties, is not directly occupied in conducting transportation, yet might prove the element needed to change failure into success.

An industry working under financial handicaps and with a great variety of unsolved problems, such as the railway industry, cannot afford to miss any opportunity for improving conditions, and a research organization will ultimately be a part of all large railway organizations. Modern industry has proved that new development is the keynote to success.

"Times Change and We Change with Them"

DURING the war the War Labor Board made numerous wage awards in the electric railway field which very nearly sapped away the life blood of the companies affected. These awards were based on the principle that the ability of the company to pay formed no part of the considerations leading to the determination of a fair wage. The awards in many cases were entirely beyond the ability of the company to pay, and while the whole industry remonstrated against the principle pronounced by the board, yet the companies responded to their patriotic duty and operated at a loss.

But times have changed. During the last few months we have seen an exactly opposite manifestation of the obligations of the railway in this matter of wages to its employees, particularly in the Middle West. At Des Moines a few weeks ago a federal judge reviewed the decision of an arbitration board granting substantial increases in pay to employees of the Des Moines City Railway for the purpose of directing the action of the receiver. The judge ordered a rate of pay 10 cents an hour less than the arbitration award and made any further pay subject to the ability of the company to pay, after the obligations for other operating expenses, maintenance, depreciation and fixed charges had been deducted from the net.

In Akron more recently an arbitration of a wage dispute on the properties of the Northern Ohio Traction & Light Company brought a decision in which the increase in wages granted was made contingent upon an increase in fares sufficient to meet the operating expenses. While the men were in accord with this finding, they later went on strike in Akron and Massillon in order to force the local city councils to understand that

they must acquiesce in a fare increase in order to enable the company to pay the men a fair wage—and they did.

In Dubuque the company was unable to pay the wages demanded because the city authorities would not grant an increase in fare to cover the increase in operating expenses which would result and the men struck. After sixty days, in which not a wheel was turned, a federal judge brought an end to the deadlock by setting aside the 5-cent clause in the franchise, permanently enjoining the city from imposing this franchise provision as to a fixed fare, and established an 8-cent fare, subject to later review, in order that the company should be able to meet the demands of its men. If we assume that the position of the company that it could not pay the wages asked on the rate of fare in force was well founded, this again was recognition by a federal officer that money cannot be paid employees that is not earned, or that a railway company cannot be expected to continue indefinitely to operate at a loss. Other cities in which the same principle has been expressed or upheld in recent wage and rate negotiations are Minneapolis, Buffalo, New Orleans, Duluth, Davenport and Rochester.

In fact, it may be said that the whole trend of utility regulation is now to make rate revision closely follow, if not actually anticipate, necessary increases in the wage scales. The general tendency to recognize the direct relation between rate of wage and revenue is also the very essence of the service-at-cost type of franchise, which is now the form of grant almost universally considered whenever a new arrangement between company and municipality is brought to the fore. All of these situations point unmistakably to the fact that there has been a decided change in the interpretation of the relation between earnings and disbursements—if the rulings of the War Labor Board could be taken at any time as an expression of the common sense of justice.

Loyalty of Employees an Encouraging Sign

AN ENCOURAGING result of this condition which we have just described is the closer feeling of interest and co-operation which is apparent in many recent cases between management and men. We have already referred editorially, under the titles "The Coaches Cannot Do It All" and "There Are Teams Now at Work," to certain conspicuous instances of loyalty of the kind mentioned. Most noticeable of these is probably the recent action of the employees of the Philadelphia Rapid Transit Company in acquiescing to a postponement of a higher wage scale to which they were admittedly entitled. This case has inspired wide publicity, possibly because it followed spectacular accounts of a disagreement between the financial and operating powers of the company in question. The expression of confidence in the management by the men was a compliment to the success of Mr. Mitten in handling labor.

Yet we hardly agree with the inference which might be derived from some of the articles which have appeared in the daily press on this subject that the incident marks the beginning of a new era of co-operation between management and labor. For, shorn of the colorful circumstances which beget publicity, the employees of a number of other companies in various parts of the country during the past six or eight months have quietly borne with their employers until the latter could place the company in a position to pay an increase. We have no desire to deprecate Mr. Mitten's accomplishment, but merely wish to point out that this incident is not an isolated example of the new spirit between managements and men. There are several places in the industry where there prevails a very fine spirit of this kind of understanding and co-operation. Even in some cases where strikes have occurred there was no quarrel between the company and its men, but with the hands of the company tied as to ability to pay more wages, the men used the strike weapon as their only means of forcing the necessary action on the part of the municipal authorities. Philadelphia has a good labor situation, but it has not an entire monopoly of it.

For Good Public Relations the Employees Must Be Boosters

WERE one to go to Marshall Field's store to make a purchase and be confronted with an increased price for a staple, and upon discussing the cause with the clerk would hear this employee of the store say that there was no reason for the increase, that the Fields were a bunch of robbers, were profiteers, were not content with their millions, but wanted to mulct the public out of other quick millions, etc., would this attitude of an employee beget confidence or would it not tend to create a bitter feeling toward the corporation and drive away patronage and support. Also, what would Marshall Field & Company do with such an employee?

Yet it is just that sort of disloyalty that one frequently finds in conversing with the platform men—the one personal contact between the street railway corporation and its patrons. What headway can a company hope to make in bettering public relations with such absence of co-operation—not to say condemnatory influence—on the part of employees?

Every company needs to better its public relations. The place to begin work and to continue work is with the employees. This should never be lost sight of, for the attitude of the employees toward the company is a tremendous force in the psychology of public sympathy and understanding.

When a passenger boards a car and says, "What about this fare increase, Conductor; does the company really need it?"—imagine the vast difference in reaction toward the company in whether that conductor answers, "You bet it does; it's costing us a third of a cent out of our own pocket every time we give you a ride for 5 cents," or whether he says, "Oh, I don't know; they say they do; but if they didn't have a bunch of ignoramuses up in the main office I guess they could get along." And just that superficial remark on the part of an employee is all that is needed to convince a great many people that the company is sincere in its contention for a higher fare or is misrepresenting for the sake of the "bloated bondholders."

One of the principal objections to municipal ownership is the tremendous force that could be used for political purposes of the large numbers of employees required on a street railway property. Why not take advantage of this force to strengthen the company's position in the community served? It can be done if a sincere effort is made to inform the employees continuously on the company's finances, its earnings, where the money goes, what is being done to improve the service—in general, what a really great interest the company has in providing good service.

A spasmodic or short-lived effort along this line will not be very fruitful. But to make the work of informing employees and inspiring in them some pride in the company and its ideals of service a part of the regular business, just as is the inspection of equipment or the auditing of conductors' returns, will surely yield a tremendous influence toward obtaining satisfied patrons, and contented employees as well.

Why Cannot Railways Here as Well as Abroad Electrify?

IS AMERICA to be recognized as more conservative than foreign nations in its reconsideration of problems of electrification of steam railroads after the war?

The family man who has been waiting during this period of hostilities for a time when he could build for himself a home is still cognizant of the fact that materials and labor are high and scarce. "Wait for better times," is his motto.

The manufacturer, desirous of expanding his business, or even of placing it upon a firm financial status, after having devoted his staff and equipment to specialized war products, finds either that new capital loans are prohibited by the Federal Reserve Board or his credit is questioned and rates of interest are abnormally high. "Not just yet," is his final slogan.

The steam railroads, involved in the throes of experimentation with the federal act which returned them to private ownership on March 1, 1920, and the problem of meeting the recently awarded increase of wages from the Labor Board and of renewing and rehabilitating their equipment, say "Possibly later, but not now."

And yet simultaneously we read, in our contemporary publications abroad, in the reports of the annual meetings of British railway companies such items as the following:

The London & Northwestern Railway appropriated £150,000 for widening its line between Chalk Farm and Willesden for electric service, and work of completing the electrification of suburban lines, postponed during the war, is in progress. The London & Southwestern Railway has decided to supersede the present electrical equipment of the Waterloo & City underground line with modern equipment and to extend the length of the trains at a cost, including additional cars, of £750,000. The Great Eastern Railway has authorized its general manager to prepare a scheme for the electrification of its lines. The London, Brighton & South Coast Railway, which has been operating its minor suburban trains electrically for some years, is encouraged to hope that at an early date the company may be able to electrify its lines throughout the whole of its suburban area. The Lancashire & Yorkshire Railway directors have recommended that the line between Manchester and Oldham, and on to Shaw and Royton, be electrified. The Great Western Railway is electrifying the Ealing & Shepherds Bush Railway. The North Eastern Railway has under consideration proposals for the electrification of the main line between York and Newcastle, 80 miles.

We must all admit surprise at reading last month in our own press of the gigantic loan of $25,000,000, at an interest rate of 8 per cent, financed by American agencies in order that the Swiss railways might be further electrified at once.

Editorial columns of our daily papers were for days discussing the causes and practicability of the high interest rate paid. The fact remains that it was paid. These steps are being taken by governments certainly no better off financially nor with respect to labor conditions than ourselves.

Are we not inclined to look upon electrification as an untried luxury rather than a well-worked-out economy? It has proved to be economically applicable to practically all railroad conditions, *i.e.*, tunnels, terminals, difficult mountain grades, through-passenger trunk-line service and heavy freight traffic. It is generally recognized as a means of conserving coal, labor and equipment. It makes very effective use of the water power which should now be readily developed upon a large scale in this country. Is it not a problem to which we must necessarily turn as the solution of some of our present difficulties of railroading instead of an ultimate goal to be coveted for some future and better day? We commend the electrification of steam railroads to our readers as an immediate need in this period of reconstruction.

Who Will Regulate the Improved Highways?

TRANSPORTATION has many agencies and each must earn a return on its investment to exist. Two complicating elements enter into a practical application of this principle, a determination of the investment and of who pays the return.

A single airplane used for transporting a few passengers a certain distance affords an example of a simple case where the investment is easily ascertained and the cost of service easily divided among the passengers and collected, but a glance at court records shows how complicated in application the principle becomes when applied to railroads and railways.

The recent advent of the motor bus and motor truck as agencies for transportation has now opened a new field for legal and engineering work to determine these items. The farmers along a state highway who have paid one-third of the cost of a good road, the county which has paid another third and the state which has paid the other third, all on the plea most suited to get the money from each, are beginning to look with new and selfish interest at the question of transportation. The farmer who gave his money to get a road so he could haul his crops to market and avoid freight rates kicks and howls because in a short time the road is ruined by heavy trucking from manufacturing plants and because touring automobiles monopolize the road and force him to drive in the gutter, if at all. The state and county object to the high maintenance on the road and accuse the solid-tired trucks and farm vehicles of doing the damage. The touring class objects to the slow movement, congestion and bad roads due to heavy trucking and wagon transportation.

This condition is bringing into being a general idea that some agency must regulate highway transportation and determine on a cost-of-service basis who should pay the bill and what it should be. As one farmer has put it, "I paid for one-third of that road on a mile frontage and am taxed for the other two-thirds, while that steel mill over there only paid for a quarter-mile frontage, yet is using it fifty times as much for its trucking."

The problem is complicated by the number of individuals concerned, the interlocking of investments in highways and the diversified rolling stock used, yet it is getting to be of primary importance, and perhaps, when commissions get to working on highway cases, it will be the turn of the steam and electric roads to look on, smile and say, "Go to it."

This Is Number Six of a Series of Articles on Salient Phases of the Electric Railway Situation

California and Her Tractions—Part I

By Edward Hungerford

IN this article Mr. Hungerford tells the story of active competition between the municipal railway in San Francisco and property privately owned. In his opinion one system must eventually come in the interests of efficient operation.

When one comes to the western edge of the country he finds the entire traction situation considerably different from that in the eastern and middle sections today. If he observe but superficially he will come to a quick decision that most of the tractions in California are doing very well indeed. Their cars seem to be in excellent condition, their tracks and terminals well maintained, their platform personnel of a high standard. Moreover, most of them are still charging 5-cent fares; a very few 6 cents, none that I discovered more than this last figure.* It looks like the good old days of before the war. And nowhere more so than in San Francisco, where not only is the 5-cent fare still stoutly maintained but a remarkably short headway of the cars at almost all hours. No city in the land has better street car service today; few, indeed, have as good.

If one be thoroughly converted to the theory that competition in transportation is fundamentally necessary to its real success then San Francisco is his apple. In no other community in the United States is there real competition. Out by the Golden Gate the municipal street railway enterprise, now eight years old and come to some 168 cars and 63 miles of track, no longer is a mere toy, but has become a real street railway system. Two years ago it may be said to have attained its majority; not in years of course, but by the annexation of the whole of Market Street—San Francisco's greatest street—and running three straight miles from the huge ferry house up to the portals of the new tunnel under the Twin Peaks.

I have neither the time nor the desire to go deeply into the policy that actuated the grab of this important thoroughfare, whose interests already were served, and very well served indeed, by several lines of the

*Since this article was written Seattle has gone to 10 cents.—EDITORS.



A car of the Municipal Railway passing out of the west portal of the Twin Peaks tunnel. This tunnel has just been completed at a cost of about $4,000,000.

United Railroads, which used and still uses the street as the main stem of its own great system of 275 miles. Many years ago its two tracks in the middle of the street were paralleled for the mile leading from the ferry house up to the beginning of Sutter Street by two more tracks of the old time Geary Street lines. A few blocks beyond on Market Street was the terminal of the Sutter Street line. It was this line, whose franchises had expired, which was taken over by the city of San Francisco as the nucleus for its proposed municipal street railway system, which then hardly passed the formative stages. It built additional tracks in Market Street to link Sutter and Geary Streets and began running the Geary Street cars through to the ferry house.

Four tracks in Market Street from the ferry house to Geary Street were quite bad enough. But when Mayor James Rolph, Jr., in accordance with his oft-expressed plan to make the street railway service of the city exclusively municipal, seized upon the idea of continuing his two municipal tracks right up that thoroughfare to the Twin Peaks Market Street became a nightmare. With but two trolley tracks in its center—originally they were cable tracks—there still has been left a comfortable roadway for vehicular traffic in either direction. Two more trolley tracks completely spoiled the thoroughfare, while a great press not only of private automobiles but of jitneys completed the assassination of the street.

Today property upon its south side —across the tracks from the chief shopping and hotel and theater district of the town, its best residential districts, too, is virtually marooned. The descending values of that side of the street tell the story. Store after store stands empty. Office after office is the same. Folk will not risk their precious lives and limbs in crossing that bedlam. So they do not cross, and the merchant or the professional man whose official habitat is upon its south side suffers, and looks for new quarters in the well-congested districts to the north of Market Street.

Nor is the United position in the matter to be envied. It possessed the two center tracks; those of the Municipal Railway are placed as closely as possible alongside them, with the direct result that the United's tracks might almost as well be lined with a high board fence for their entire course up and down Market Street, for it is far easier to cross that strenuous thoroughfare than for any nervous or timid person to attempt to board the cars upon its inner tracks. The outer tracks—those of the Municipal line —are easy enough. And the facility of boarding the city's own cars is increased by the heavy stone waiting stations or landings along Market Street through the heart of the town. With the result that the United Railroads gets practically no



The ferry house at the foot of Market Street in San Francisco is the portal through which thousands of commuters from the cities on the east side of the bay enter San Francisco on the morning of every workday and leave in the evening. It is an important electric railway traffic center.

opportunity whatsoever at the fine short-haul business which comes at all hours between that heart and the ferry house, which is virtually the exclusive portal of the great communities of Oakland and Berkeley and Alameda, across the bay, some 300,000 folk all told.

CABLE CARS STILL RUN IN SAN FRANCISCO

San Francisco is the city of the short-haul rider. Her most peculiar conformation has made this possible. Long ago her great hills bade defiance to the growth of the town. They seemed an impassable barrier to its development. And so as it grew it struggled for a foothold on the narrow sand stretches around their bases—until the day came when a genius of an engineer laughed at Nob Hill and Russian Hill and promptly proceeded to overcome them.



One of the first cable cars to operate in San Francisco (reproduced from an old photograph). In the panel is a portrait of Andrew S. Hallidie, who built the line on Clay Street, the first cable line in San Francisco.

What, haul street cars by a rope? Of course, replied the genius. His name was Andrew S. Hallidie, and he was just a plain, ordinary sort of man, even as you and I; yet a man with a very real idea. Because it was a real idea it presently came into being. And San Francisco was the first city of all the world to ride upon a cable railroad. That was in 1873. It has been riding upon them ever since.

Does your friend the banker down in California Street, which is the Wall Street of San Francisco, tell you to run up to the Pacific Union Club for a bite of lunch with him? Presto! You hop aboard one of the gaily painted and caparisoned little cars of the California Street Cable Railroad, whose equipment has not been changed in style or appearance for nearly forty years, and the gay little car hauls you up four or five fearful city blocks, at a grade of from 18 to 20 per cent for most of the way. The little cable road looks obsolete. On the contrary, however, it is very much of a going institution, paying 7 per cent on a fair capitalization and putting aside $20,000 or $25,000 a year in cash surplus. It takes off its hat to none of its larger brethren.

Nor is the cable car of San Francisco apt to doff its chapeau to its bigger and more powerful brother of the trolley at any time in the immediate future. Even the most optimistic of electrical engineers shake their heads at the idea of propelling street cars over 20 per cent grades in 100 per cent of safety. So San Francisco, like Seattle, bids fair to continue the unique method of street transportation to which it gave birth. And these two cities are the only ones in the entire United States to cling to the method of propulsion that once swept like wildfire all the way across the land.

The problem of eventual control in the city by the Golden Gate is not nearly so easily solved as that of the mere mechanical means of propulsion. For, as most traction men already know, it is there that the municipally owned and operated street railroad has attained its stoutest foothold in all the United States. I have referred already to this second distinctive feature of San Francisco street transportation in its connection with the most difficult Market Street situation. Now consider for a moment or two how it has attained its real strength.

HOW THE MUNICIPAL ROAD BEGAN

The Geary Street line, which was its first link, was in the beginning also operated by cable. Its franchise rights expired a little more than eight years ago, and the city, taking over the street to itself, announced that here would be the beginning of its municipal railroad experiment. It paid nothing for the existing property of the old company, but pulled out the cables and scrapped its cars and tracks, replacing them with a brand-new electric line, running from the ferry house—the great head and front of San Francisco trolley traffic—right through to the ocean; some nine miles all told. The old cable road had had its downtown terminus right at Market Street. That did not satisfy the city administration. Its traffic sense said that the line must run through to the ferry house. And so it bended it right into Market and by new trackage to the existing four tracks for the short distance between Sutter Street and the waterside. The outer tracks for this short distance belonged to the United Railroads. But the city administration did not quibble at that. Nor hesitate. It appropriated them for its own purposes, and the assassination of San Francisco's chief business street was begun.

Translate "city administration" into Mayor Rolph, Jr., who has been the alcalde of San Francisco for four terms now, or the eight years in which the municipal railroad enterprise has been in existence, and you begin to get the right understanding of the whole situation. With no desire whatsoever to write a treatise on San Francisco politics, permit me to say that Rolph frankly is a labor union mayor. A rich man himself and keenly successful, he makes no hesitation in saying that he represents labor and the things for which labor stands there in the fine new city hall, and rarely fails to be consistent.

No better inaugural link for a city municipal railroad could readily be imagined than the Geary Street line. From the beginning it has paid and paid well. It hardly could fail to pay, cutting through the heart of the city's best wholesale and retail districts and then threading a high-grade residential district closely built in for almost the entire distance out to the ocean. With his venture in municipal operation so auspiciously begun, Rolph found little difficulty in summoning public approval to future experiments along these lines.

THE MUNICIPAL ROAD GROWS

The next of the small independent city railroads of San Francisco whose franchise expired was the Union Street line, running from the Presidio district under and over Russian Hill close to the waterfront and the almost inevitable ferry house. In the days before the great fire of 1906 this too had been a cable road. Yet after that supreme catastrophe electricity was used as power, despite the fact that some of its grades attain 13 per cent, and 10 per cent is regarded by most San Francisco engineers as the maximum for electric power there. The Union Street line was another good thing. The municipal railroad's books responded to its acquisition.

After Union Street came California Street, the section out beyond the cable line, and which was quickly made a branch of the original Geary Street main stem. The coming of the exposition of 1915 made a logical excuse for the municipal railway beginning brand-new construction on its own account; a line was projected the entire length of Van Ness Avenue, linking together Market Street and Geary and Union. Van Ness Avenue originally had been designed as a boulevard. Repeated requests from private corporations to occupy it with tracks had always been sternly refused. And the United Railroads had been forced in turn to occupy the parallel Polk Street, one block to the east.

But what is the city to the city? Mayor Rolph asked Mayor Rolph if the fastest growing municipal railroad could occupy Van Ness Avenue and Mayor Rolph replied to Mayor Rolph that certainly it could. And it did. While soon afterward came the full assassination of Market Street. That thoroughfare was essential to the Mayor's plans. It was neither good traction nor good politics to develop the section north of Market and completely ignore those to the south. So lines were projected south from the great main street at Church and again at Potrero. To place these in any efficient competition whatsoever with those of the United Railroads Market Street was essential to the Mayor's needs. The United already held the center of that thoroughfare. But the Muncipal was upon its sides all the way from Geary to the ferry house. What mattered such a nightmare for another mile or two miles then? So Mr. Rolph's decision. And followed decision with the laying of tracks.

coup in the completion of the 12,000-ft. double-track tunnel through the very heart of the Twin Peaks, at a cost somewhat in excess of $4,000,000. This important engineering work virtually continues Market Street in a straight line through and past what for years has been a seemingly impregnable barrier and opens up a great new section of the city for immediate development. But only for the Municipal Railway. It may and does traverse the great bore at no rental charge whatsoever. The United Railroads may not operate upon these tracks under any consid-



Cable cars are still running in San Francisco. They are used on streets with grades of 18 per cent or more, on which electric cars would not be suitable. This view of a modern cable car shows that those now in operation do not differ greatly in appearance from the original cars of 1873.

Up to this time the Goliath-like United Railroads had confronted the fresh onslaughts of the traction David; not without protest, but without definite action. But the robbery of its exclusive rights the full length of Market Street was quite too much. It began a legal battle against that invasion of its privileges which carried all the way east to the Supreme Court at Washington. There it lost. But the decision which permitted the Municipal Railway tracks to remain in the street also said that the United Railroads might bring suit for any damages which it felt that it had incurred by the invasion of the street by its competitor. This it is proceeding to do. It already places its bill of damages at something in excess of $8,000,000 and is prepared to press the bill to great lengths—even up to the United States Supreme Court once again if that be necessary.

In the meantime the Mayor of San Francisco has executed another eration. And, I should add, at this moment is not particularly anxious to do so.

WHAT THE FUTURE HOLDS FORTH

Its own future, no matter how large a part of its $8,000,000 damage bill it may yet gain, is most uncertain. Its important franchises have until 1929 to run. Until then it cannot be ousted from any of its streets in San Francisco. It is today in the process of financial reorganization. Its bonded indebtedness is being reduced to a point at which it is expected a 4 per cent interest can readily be earned. As for the stockholders, I might ask what business a man has being a traction company stockholder today, unless it be in some ancient family affair like the time-honored California Street Cable Railroad. But these do not grow in every civic bush. For verification ask the stockholders of the United Railroads who sent $8,000,000 in gold out to San Francisco at the

time of the great fire for the rehabilitation of their property so that it might again be serving the citizens of that sore-stricken town.

One might expect the *morale* of a street railroad system which had been so constantly under successful attack to be waning. As a matter of fact, the exact opposite is true of the United Railroads. I found by a little investigation that it not only had the lowest labor turnover of any street railway upon the Pacific Coast but, with two noteworthy exceptions, of any industry whatever in that great section of the country. It is well below that of the Municipal Railway. And although its men receive a slightly lower wage per hour than those of the city-owned system, who are paid $5 for an eight-hour day and permitted no overtime whatsoever, through their overtime they not only equal but generally exceed the weekly earnings of their civic competitors.



Looking down Market Street toward the ferry house, which is about three-quarters of a mile distant. This view was taken between Second and Third Streets at a time when there were only two tracks there

One System Must Eventually Come

What will be the eventual outcome of this perplexing dual situation in San Francisco?

I think that this is not very difficult to foresee. The Municipal Railway, young and triumphant in its strength, must acquire the lines of the United Railroads; preferably in the very near future rather than to wait for the 1929 crop of expired franchises.

If the city of San Francisco is fair—I am not saying a word about generosity—it will pay for those lines at a fair valuation. The men who personally have been of greatest aid to the Mayor in the achievement of his traction triumph say this themselves. It is only the bitterest of radicals who demand that the old private corporation be clubbed entirely to death and that its property be paid for at junk rates—if ever paid for at all. Better reason tends toward the fair valuation process. And to this the United Railroads is now quite willing to accede.

Today the Municipal Railway has achieved a real success. There is no use in trying to evade that fact, even though one may very much question the methods by which its triumph was attained. It is not extravagantly operated, although the organization recently has been eating into its depreciation account—$116,000 for the year ended June 30, 1919; probably some $400,000 for these next twelve months.

"But," reply its managers, "steadily and for years past we have annually charged off 18 per cent of our gross receipts as depreciation. How many traction systems are doing that today? We have more than $1,500,000 in accumulated reserve. Out of the $5,500,000 in bonds which we originally issued for the construction of this property we have retired $600,000, and the bond issue represents 18 additional miles of line, builded at a cost of $60,000 a mile, in addition to the 45 miles that it was originally supposed to carry."

They make a good case for themselves, these managers. And with so good a case, such confident strength, they should, and I believe in the long run they will, make not only a decent but a very fair bargain with the United Railroads. No matter what may have been the shortcomings of that property at times in the past, the fact remains indisputable that it was and still is a genuine servant of San Francisco, serving it in good seasons and in bad. And faithful servants are not generally turned away merely because they have become broken.

Will the Municipal Railway be able to continue, despite rising operating costs, at a 5-cent fare?

That is another and a very different question. With the steady eating into the depreciation account—which, as we have just seen, is merely a matter of bookkeeping when there is so generous a depreciation charged off—that problem begins to confront the Mayor and his advisers. I do not believe that they underrate its seriousness. Yet if the keen-minded Mayor of San Francisco, who is very much of a law unto himself, is led at all by the advice of some of the wisest of his associates he will not hesitate at the fare-raising step when the next wage advance—the French would call it a crisis—arises. This bids fair to come in the near future. The men of the Municipal Railway are discontented with their $5 a day, even though San Francisco is today perhaps the cheapest city in the United States in which to live. But the street cleaners—another arm of the city service—are beginning to get $6 a day.

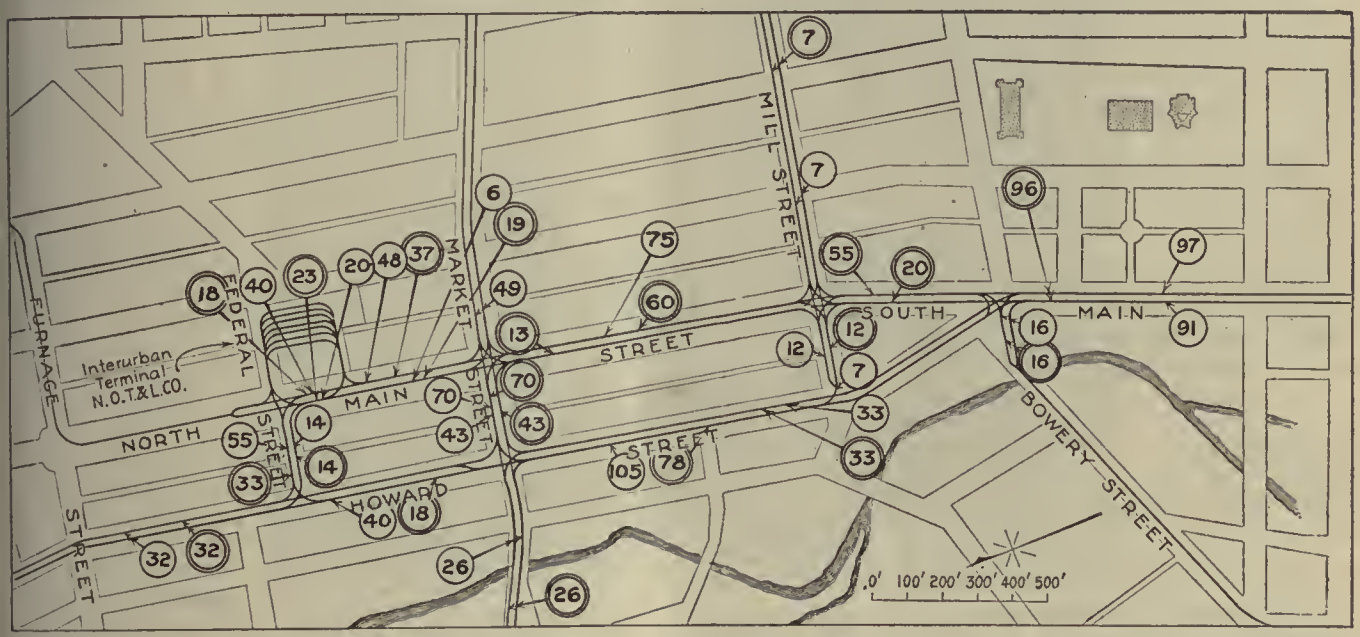
Surely it takes more brains to run either end of a trolley car than to manicure the cobblestones or the asphalt? That is what those self-same trolleymen are already beginning to ask of one another. Out of such questionings there can come but one inevitable answer—a demand for $6 a day, or more, which must be met by the City Hall. That is politics. When politics intermingles with actual business strange problems such as this arise. When the Municipal Railway completely swallows the United Railroads they will multiply. Then it will be faced with the necessity of operating not merely lines which are unprofitable because they are remote, but other lines which are unprofitable because they are too closely set together. A decade of competition multiplies street railways and places them, not always for the best public interest but in the strongest strategic position.

These problems the Municipal Railway of San Francisco will yet have to meet and to solve. And upon its method of solution will rest, in no small degree, the fate of other municipal railway projects in the United States. Of this I am very sure.

Rerouting in Akron Saves $60,000

Installation of Some Through Routes and the Shifting of Others in the Downtown Section Result in the Speeding Up of Cars

A PLAN of through-routing certain lines and rerouting others in the downtown section of Akron, Ohio, was recently worked out for A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company, by J. F. Layng. This plan has been installed and has so reduced the mileage and improved the speed of the cars through the congested section of the city that a saving in operating expenses of from $60,000 to $75,000 a year is expected to be realized. The plan of rerouting and the extent to which it changed the maximum number of cars per hour over any section of track may be seen in the accompanying map of the central section of the city, on which the final results of the rerouting study as to number of cars over each section of track are entered.



MAP OF AKRON BUSINESS SECTION, SHOWING THE NUMBER OF CARS DURING THE RUSH HOUR ON EACH SECTION OF TRACK BEFORE AND AFTER ADOPTING REROUTING PLAN. THE CARS FORMERLY ON EACH ROUTE ARE SHOWN IN SINGLE CIRCLES, THOSE UNDER THE NEW ROUTING IN DOUBLE CIRCLES.

To begin with, the number of cars passing over any section of track during the rush hour between 5 and 6 p.m. was compiled and entered on the map, with details of the number of cars from each line contributing to the total. These total figures are shown inclosed in the single circles, though the details as to the lines and number of cars of each line have been omitted in the accompanying reproduction. With this information entered on the map for every block of track it was comparatively simple to see which sections of track were worst overloaded, when the amount of vehicular traffic was taken into consideration. The study to readjust the routes so that these overloaded sections would be relieved and to eliminate dead mileage wherever practicable could then be made.

As the changes in routing were worked out, the new figures showing the number of cars during the rush hour were also put on the map. The figures which appear in the double circles on the map are, of course, the result of the completed plan. On the original of this map the data for conditions before and after rerouting were entered respectively in black and red ink, making the references simpler than in the reproduction given here.

The more important changes made in the routing were as follows:

The Spicer line, which formerly entered the downtown district from the east over Mill Street and looped back by turning north on South Main Street, west on Market Street, south on Howard Street, and back east on Mill Street, was through-routed with the Wooster Avenue line, the Spicer cars thus turning south instead of north at South Main Street and eliminating altogether the dead mileage of this downtown loop. This provided through operation from the Wooster Avenue district to the Goodyear Rubber Company plant and eliminated the necessity for numerous passengers to transfer.

The Lakeside cars, which formerly looped around the same square as the Spicer cars, were through-routed from the south on Main Street to the west on Market Street, with the Rose Avenue line. Northbound these cars operate over South Main Street to Market Street and thence west, but southbound they turn off Market Street at Howard Street, which converges a few blocks further south with South Main Street. The Lakeside cars previously received a large transfer load from the west Market Street cars, but this is greatly reduced with the new operation, which gives a direct line from the Market Street residence district to the Goodrich and Firestone plants.

The Kenmore cars formerly came up North Main Street from the south and looped back through Federal

and Howard Streets. These cars are now turned back at Market Street instead of Federal, thereby eliminating the dead mileage of one square. Another change was the looping of the Barberton cars through the interurban terminal station instead of via Federal and Howard Streets. These cars now discharge their passengers in the terminal, but do not load until after leaving the terminal and proceeding south to a loading point established at the opposite end of the block from the terminal, in front of the Portage Hotel. This routing of the Barberton cars removes traffic interference with the interurban cars entering the terminal and clears the northbound track for the Silver Lake and Gorge Loop cars.

The old and new routing for any line can be traced out on the map by studying the data entered there as to lines contributing to the total number of cars over any section of track.

Results of the Rerouting

By comparing the corresponding figures in single and double circles it will be noted that considerable reduction in the number of cars during the rush hour has been obtained in several cases. The heaviest traffic under previous routing was over the southbound track on Howard Street, between Market and Mill Streets, and here the number of cars was reduced from 105 to seventy-eight. On Federal Street the westbound traffic was reduced from fifty-five to thirty-three cars, and so on.

The saving in car mileage per day resulting from the elimination of loops and the cutting back of the loop of the Kenmore cars is summed up as follows:

	Number of cars and saving per car	Saving per line
Kenmore line	97 cars x 1,200 ft.	116,400 ft.
Barberton line	No saving in miles	
Wadsworth line	21 cars x 250 ft.	5,250 ft.
Spicer line	154 cars x 2,600 ft.	405,600 ft.
Lakeside line	153 cars x 3,400 ft.	520,200 ft.
Wooster-Rose line	211 cars x 250 ft.	52,750 ft.
Total saving		1,100,200 ft.

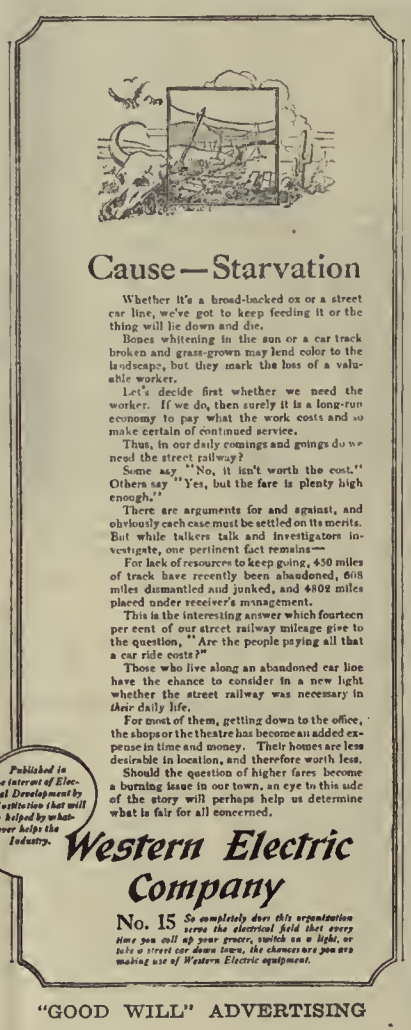
This is equivalent to 209 car-miles per day. If the mileage saving is figured at 35 cents per car-mile and the time gained from relieving traffic congestion and speeding up cars is included the estimated saving is placed at from $60,000 to $75,000 per year.

Two Accidents Analyzed

A REPORT of the Bureau of Safety, Interstate Commerce Commission, on accidents 639 to 657 inclusive, for the last quarter of 1919, contains reports on two electric railway accidents. The first was a rear-end collision on Oct. 4, 1919, between two passenger cars of the Buffalo & Lake Erie Traction Company, and resulted in the death of six passengers and the injury of twenty-five passengers and three employees. The rear car was an interurban car, whose forward bumper was 18 in. higher than the rear bumper of the local car and overslid the latter. The report says, in part: "Investigations also develop that it is not required that red lights be displayed on the rear of the local cars, it being believed by the officials that the white lights in the rear vestibules and the reflection of the ceiling lights are sufficient protection against following trains. The assistant general manager stated that the officials endeavor rigidly to enforce rule 84, requiring trains running in the same direction to keep at least 1,500 ft. apart. The absence of a red light or marker on the rear of car No. 400 undoubtedly contributed in a measure to the accident."

The second accident reported was a rear end collision on Dec. 21, 1919, between two electric motor cars on the Detroit United Railway, resulting in the death of one employee and the injury of two passengers. According to the report of the commission, "this accident was caused by the failure of the motorman of the following car to have his car under control when approaching the scheduled meeting point for his train. While there is no evidence of anything having been wrong with the air brakes, had there been anything wrong and had the motorman complied with this rule (to test air brakes 1,500 feet ahead of junctions, crossings, etc.) he would have been able to stop his car in time to avoid the accident."

Western Electric Continues Its Series of Industry Advertising



"GOOD WILL" ADVERTISING

THE Western Electric Company, whose campaign of education in the interests of the electrical industry during the first part of this year was mentioned in the issue of this paper for Feb. 7, is continuing this praiseworthy effort. A new series of ten advertisements, whose purpose is to promote the public good will and understanding of public utility problems, has been prepared and during the last half of this year will appear in eleven popular publications. Two of these advertisements relate directly to the electric railway industry, while others argue the case of the central station, telephone company, steam railroad, contractor and architect and engineer. One of the street railway advertisements is illustrated herewith.

As the purpose of these advertisements, in the words of the president of the Western Electric Company, is to "change public prejudice into public trust," the company offers to furnish electrotypes of these advertisements in any size upon request to utilities for use in their local papers, or permission will be granted to use the copy in any way desired, either with or without a reference to the Western Electric Company's name.

Battery Cars Changed to Safety Cars

Conversion of Fifty Storage Battery Cars to Safety Cars for One and Two-Man Operation by the Third Avenue Railway, New York, for Use in Outlying Districts Presents Some Interesting Features

By R. H. PARSONS
General Foreman Third Avenue Railway, New York, N. Y.

TWO PROBLEMS, both important, are being solved by the Third Avenue Railway, New York City, with the reconstruction of fifty cars, formerly operated by storage batteries, to one-man safety cars equipped for service on 550-volt overhead lines. First, the withdrawal of the storage battery cars from some lines and an overabundance of battery cars to serve the remaining lines made these car bodies available for reconstruction. Second, the developing of short-haul riding and the habit of riding in certain districts where the lines served principally as feeders for rapid transit lines was necessary. As described in the ELECTRIC RAILWAY JOURNAL for May 18 and Aug. 10, 1918, the Third Avenue Railway began operation with converted safety cars with this object in view more than two years ago. Twenty-five cars, each weighing 26,000 lb. light, were put into service, equipped with foot control and safety devices for one-man operation. These proved very successful and resulted in a marked increase in the number of passengers carried. A year later fifty standard closed cars, weighing 30,000 lb. each, were equipped with foot control and pneumatically operated doors and were used as one-man or two-men cars as desired. These also gave perfect satisfaction. From the results of this operation it was evident that many of the lines which previously had not been considered as paying propositions could be made at least to pay expenses and others could be turned into revenue-producing lines by the use of smaller cars operated by one man on short headways.



FINISHED CAR WITH TRUSSED TROLLEY SUPPORT, FOLDING DOORS AND STEPS AND LATEST DESIGN OF SAFETY TRUCK

This led to the reconstruction of two of the older storage battery cars into safety cars as sample equipments. New trucks and new equipment were installed and changes made in the car body construction as were necessary for this operation, and the final result is shown in the accompanying illustrations. Additional cars to make a total of fifty are now being reconstructed as rapidly as possible.

The first difficulty encountered in changing these cars from battery operation to trolley was the fact that the car body and roof were not of a sufficiently strong construction to sustain the weight of a trolley base. This was overcome by reinforcing the roof with a 1½ in. x 1½ in. angle, bent to fit the shape of the corner post header, ventilator end pillar and end rafter, as shown in an accompanying illustration. An additional truss running the length of the car was also installed, which was well fastened at each corner of the car and made fast to each side post. In the illustration showing this construction a fair idea can be gained of the method of wiring. As much of the wire as possible was placed behind the sign panels, molding, etc., as the experience of this company has been that less trouble results and a much safer installation is provided by this method than in any other way, even when the wires are installed in conduit. This arrangement is also much lighter than conduit construction, which is an essential factor in this equipment.

The illustration of the completed car shows the construction of the trolley base supports, which are trussed so as to give strength to the roof, to provide support and insulation for the trolley base, and at the same time to leave a convenient and protected place for the fuse box and choke coil for the lightning arrester. The choke coil is installed underneath the support for the trolley base and the fuse box is installed at the end of this support. The roof board is arranged for two trolley stands and poles, but one, however, is used at present.

SUBSTANTIAL SUPPORT FOR EQUIPMENT PROVIDED

In addition to the reinforcement provided inside the car and on the roof an angle iron framework is added underneath the car body. Some details are shown in the view of the underneath car body construction. The storage battery car truck as originally used consisted mostly of a top frame piece, which was a 3 in. x 5 in. x ½ in. angle. As these battery trucks are not used

with the new construction, this angle was available for the car body reinforcing. It has thus been saved and is bolted to the car body along each lower edge. To these side angles trusses for the car body, the car equipment itself is bolted. Two 3 in. x 3 in. angles are fastened to the inside edges of the side angles to provide substantial supports for the air compressor, the brake cylinder and the control group switch. These also help to tie the sides together. Additional angles running lengthwise on the car body are installed to these cross members to provide support for the equipment in the location necessary. The heavy equipment is thus supported entirely by this angle framework independent of the car body. As the body end and center spring caps are bolted directly to the side angles the weight of this supporting framework, together with the equipment parts, is transmitted directly through the end and center springs to the truck. The truck used is the standard Brill No. 79-E with 24-in. wheels.

The control and operating equipment for the car is of a new type designed by J. S. McWhirter, superintendent of equipment Third Avenue Railway, and built by the Westinghouse Electric & Manufacturing Company. Its chief feature is the arrangement for foot operation of the control, air brakes and doors so as to leave the operator's hands free for collecting fares, issuing transfers and other necessary duties. All of the well known safety features commonly used for car operation by one man are provided but are accomplished by new methods. The "dead man" feature for cutting off power and applying the air brakes includes in addition to the emergency application of the brakes the exhausting of air from the door operators, so that the doors can be readily opened by hand. Interlocking of door and control circuits also makes it impossible to start the car with doors open or to open them before the car stops. The control and operating equipment consists of the following apparatus: Two 506-A motors, two 33-A selector switches, two 494 control and reset switches, two 503 canopy switches, one 108-B automatic sequence switch, one 801 switch group, together with the necessary rheostats for the control and motor circuits, and the foot attachment to the controller and air brake valve, as shown in the illustrations of the platform equipment.



AT LEFT, END AND SIDE TRUSSES USED TO STRENGTHEN CAR BODY. AT RIGHT, END TRUSS CARRIED ACROSS CAR TO SUPPORT ROOF

The functions and the various features of the apparatus will be best understood from a description of its operation. The selector switch, which is more commonly known as a master controller, has besides its neutral position three points forward and three reverse. The three points used for forward movement are, first, a position with the two motors in series and all resistance in circuit; second, a point with both motors in series and all resistance cut out, and, third, a full parallel position with all resistance cut out. The closing of the circuit for the operation of the various switches in the switch group is accomplished by pushing down the foot pedal by the operator. Thus, to operate the car forward, the handle of the selector switch is placed in any of its three positions, according to traffic conditions, and the operator by pushing down on the foot pedal then closes the auxiliary control circuits and the car will automatically accelerate to the speed desired and the car will continue to run at that speed until the handle of the selector switch is placed in another position, at which time the control will adjust itself to the changed position.

Of the three reverse points on the selector switch the first two are the same as the first two for forward movement, except of course that the car will run in the reverse direction. The third point, however, is an emergency one. In this position the circuits are established for bucking the two motors. Line voltage is entirely cut off and the circuits are closed, so that the counter electromotive force will cause one motor to act as a generator, through the various windings of the other motor, and thus provide an emergency means for stopping the car should the air brakes and power fail. This position of the handle for the selector switch is mechanically interlocked, so that when the handle is once placed in this position it must remain there until it is unlocked by pulling down a short wire which projects from underneath the selector switch. To return the handle to its "off" position this must be unlocked and held in the unlocked position with one hand, while the other hand returns the handle to the desired position. This feature is to avoid the possibility of operating in and out of this emergency point, as there is danger of burning the controller contacts should the circuit be closed or immediately opened before the car stops.

The contacts in the selector switches close the circuit for operating the group switch, which consists of five contactors electrically operated. These contactors close the main circuits for the series and parallel positions of the motors and for the cutting out of the main motor resistance. The "on" movement of the various contactors in the group switch is regulated by a sequence switch, which prevents the changing of connections for cutting out an additional step of resistance or for changing from series to parallel position until the current value for that particular point has dropped to a safe limit. This sequence switch, however, is not a time or current limit, but is controlled by the load on the main motors. The sequence switch consists of a small drum which has segments for making contact with fingers similar to the ordinary controller. This drum is operated by a small motor connected in parallel with one of the main motors and drives the drum through a worm gear. The speed of this motor varies with the load on the main motors operating the car, so that the acceleration of this small motor is controlled by this load. The circuits established by the selector switch in





At left, much of the electrical equipment is located underneath the longitudinal seats. In center, the door operator is located opposite the unused left hand door. At right, a box covering for the door operator serves as a seat for the motorman.



LOCATION OF EQUIPMENT UNDER LONGITUDINAL SEATS AND IN VESTIBULE MAKES INSPECTION AND REPAIR AN EASY TASK

turn control the operation of the contactors, so that the acceleration of the car is in reality controlled by its load and the speed at which it accelerates with this load.

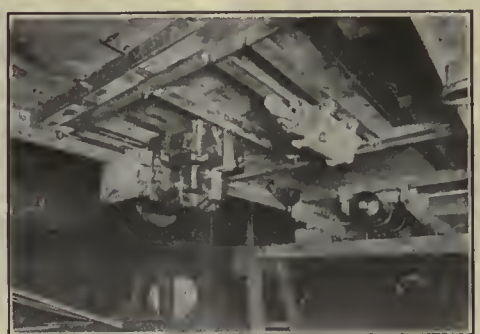
Foot Operation of Control

The foot-control mechanism consists of a pedal hinged so that the front portion operates up and down. The rear end of this pedal is weighted so that the front end is kept normally in its "up" position. Through its mechanical connection to the brake valve and its mechanical and electrical connections to the control equipment with the pedal in its "up" position power is cut off from the motors and the brakes are applied in emergency. The so-called "dead man's" feature is thus provided with this equipment, in a similar manner to equipments having hand operation, except that in this case the emergency application occurs when pressure is released from the foot pedal. This pedal is made so that it will fold out of the way when the operator is not using that end of the car.

By pushing down the foot pedal necessary connections are established for closing the door on the operator's end or both doors if they are open. Interlocks are provided to the doors, so that when they are closed circuits are established for the operation of the control and the movement of the car. The circuit for opening the door is interlocked through the line switch, so that the doors cannot be opened while power is on, and also through a relay which is operated by the regenerative voltage of the main motors, so that the doors cannot be opened while the car is coasting. This interlocking of the control and the door-operating equipment provides another much desired safety feature, which is that the car cannot be started with the doors open and the doors cannot be opened while the car is in motion.

In the view showing the operating equipment as installed on the platform of these cars two push buttons may be seen just to the left of the selector switch. These push buttons are furnished by the Consolidated Car Heating Company and are arranged for use on 600 volts. Each has its distinctive function. The left push button of the two is for opening the doors. This establishes the circuit through the magnet of the door engine, which is of the National Pneumatic Company's type of electro-pneumatic engine. The push button to the right of this is an emergency button for the operation of the car and it enables the operator to start the car with the doors open by holding in this button. This









AT LEFT, THE FOOT PEDAL FOLDS BACK OUT OF THE WAY WHEN NOT IN USE. TOP, CENTER, HEAVY EQUIPMENT IS SUPPORTED FROM ANGLE IRON FRAMEWORK UNDERNEATH CAR BODY. BOTTOM, CENTER, SAFETY CAR TRUCKS AND LONGITUDINAL ANGLE REINFORCEMENT OF CAR BODY. AT RIGHT, SIMPLIFIED BRAKE RIGGING MAKES SLACK ADJUSTER INSTALLATION EASY

may be used in case a door is inoperative or at other locations where it is desirable to operate the car with the door open.

The air line to the door engine is charged through what is known as a standard Westinghouse "on" magnet, which allows air to enter this line only when the valve is energized electrically. This magnet is connected with the foot pedal and control mechanism in such a way that whenever the air brakes are applied in emergency application or whenever power is lost by the pole coming off the trolley wire this magnet is de-energized and immediately air is bled from the door engine line, so that the doors can be readily opened by hand. Otherwise, with the air pressure on the door engine they are locked and cannot be opened except as controlled by the operator.

Hand-Operated Sanding Provided

To the left of the operator and convenient for him as he sits on his seat is the sand lever, which is operated by pulling toward the operator. This is within easy reach and as both hands of the operator are free in the major operation of the car sand can be applied as is desired.

Directly above this sanding lever may be seen the end of a bell cord which rings a gong on the roof. As the operator uses his feet on the pedal, hand operation of the gong is essential, also its location on the roof apparently has added advantages in ease of inspection and repair.

Standard straight air brake equipment is provided for these cars. This equipment is not new, and with the exception of the brake cylinder, which is 6 in. x 10 in., the other parts were taken from cars of the company not at present in service. The air brake equipment includes a National A-3 compressor, National type PV brake valve, a Westinghouse type E governor and standard Westinghouse gages. As already mentioned, operation of the brake valve is by means of the foot pedal. These cars are also equipped with standard Peacock type G brakes, with drum sheaves to reverse the motion of the chains. In the view of the car showing the underside completely equipped, the compressor, group switch, brake rigging and a Gould slack adjuster may be seen. The car body brake rigging as installed provides a very simple arrangement.

Other Construction and Equipment Details

On each platform just to the right of the operator are two upright stanchions, which serve as guides for the curtain used to protect the motorman from the light when operating at night. These stanchions also serve as supports for a Johnson fare box. Its location is directly in front of passengers as they board the car and within easy access of the operator.

Other equipment used on these cars are Consolidated Car Heating Company's panel heaters, of which six are provided for each car; Utility Company's thermostat and heater switch for controlling heat regulation, which is standard for the Third Avenue system; a coasting recorder, Hunter illuminated signs and a General Electric electrolytic lightning arrester.

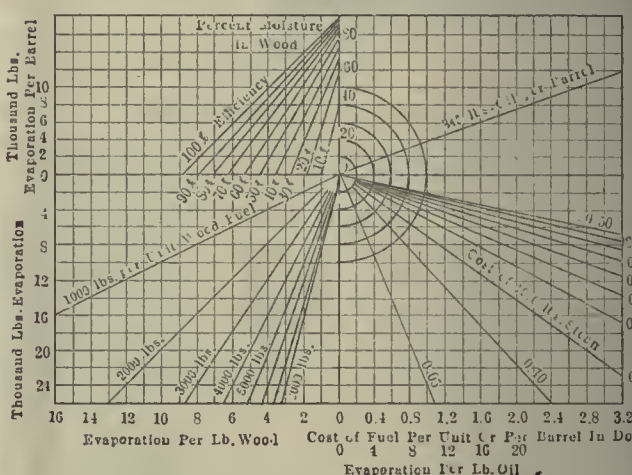
These cars as reconstructed weigh 15,000 lb. and have longitudinal seats which seat twenty-six passengers. At this writing fifteen cars are in service and arrangements have been made for equipping a total of fifty of these cars as rapidly as the equipment can be delivered by the manufacturers.

Fuels to Replace Coal Are Being Sought by Electric Railways*

Substitutes Were Proposed and Their Relative Advantages Presented in a Recent Paper Before the Portland Convention of A. I. E. E.

By Darrah Corbet
With Charles C. Moore & Company, Seattle

SAWMILL refuse, ranging from fine sawdust to large blocks of hard wood, at least 1 ft. square, is available for fuel in power stations in many sections of the country, particularly in the Northwest. Such fuel has been successfully used by the Portland Railway, Light & Power Company. Extensive tests made in connection with the use of this fuel by the latter company are included in the paper. Analyses of the various



CURVES OF COMPARATIVE VALUES WOOD AND OIL FUEL
Evaporation from and at 212 deg. F.

kinds of wood available in such refuse are given, together with their heat units and relative fuel values. An average of approximately 8,500 B.t.u. per pound of dry non-resinous wood is used in the tabulation.

This fuel can be readily stored for a considerable length of time, either in fuel houses or in the open air. There is unquestionably some depreciation in the fuel value of such refuse after storage. Cases are cited, however, of successful use of this fuel after several years' exposure. The amount of ash and moisture was found to be somewhat increased, however. The storage and use of this fuel are not considered to be a great fire risk, and no record has been made of any fire having been started in a fuel house or a pile of fuel due to spontaneous combustion. Few fires have occurred which have destroyed fuel houses.

Although it is probable that better efficiency could be secured with hand firing and special furnace design, in the majority of installations the original furnace is fed in a more or less continuous stream, the fuel being delivered through a hole in the top of the furnace and allowed to pile up in a cone on the grate. Such a method is very economical of labor, as one man can readily take care of several thousand horsepower of boilers in a properly designed plant. Desirable changes in furnace design are included in the paper in considerable detail.

Although there are several methods of determining

*Abstract of paper presented at Pacific Coast convention of American Institute of Electrical Engineers, Portland, July 21-24.

the available heat value of such fuel, the accompanying diagram showing a comparison between the economies of such refuse and fuel oil is expressed in terms of the calculated total heat in a pound of dry wood. The unit of measurement for such fuel has been rather arbitrarily established as 200 cu.ft. Of course, the weight of the various fuels per unit will vary somewhat.

"As an explanation of the use of the curve we can assume the following conditions and follow through a determination: Oil, $1 a barrel; 12 lb. evaporation per pound of oil; sawmill refuse fuel, containing 45 per cent moisture, weighing 20 lb. per cubic foot; efficiency 60 per cent. The problem is to determine what can be paid for sawmill refuse fuel per unit to equal the fuel value of oil at the price stated.

Starting with the value of 12 lb. of evaporation per pound of oil, directly above this at the point of intersection with the line indicating the pounds of oil per barrel, we note that on the left the total evaporation per barrel of oil is 4,080 lb. Transferring this below the line as indicated by the semicircle and carrying 4,080 lb. evaporation across to the right we note that over the figure $1 per barrel the cost of 1,000 lb. of steam is about 24½ cents.

Starting again with 45 per cent moisture in the sawmill fuel and going to the left to the point of intersection of 60 per cent efficiency, we note that the evaporation per pound of wood is approximately 2.3 lb. water, or with 4,000 lb. per unit this is equivalent to about 9,200 lb. of water per unit of fuel. Carrying this to the right to the point of intersection with the line indicating cost of steam 24½ cents per 1,000 lb., we note $2.25 as the equivalent cost of a unit of fuel.

On the same basis, if oil cost $2 a barrel the equivalent cost of sawmill refuse would be twice the above, or $4.50 a unit. In this manner a ready reference is secured and the curve can probably be read far more accurately than will be the assumptions made.

With regard to the use of powdered in place of ordinary coal, the results obtained by several power stations, particularly in the Northwest, are quoted.

At the plant of the Pacific Coal Company at Renton, Wash., about 200,000 tons of sludge coal have accumulated during the past fifteen years, which tested with 20 per cent moisture, 25 per cent ash and about 7,500 B.t.u. per lb. This fuel is practically useless in its present form, but after being pulverized an average evaporation at this plant of 5 lb. of water from and at 212 deg. F. per pound of coal was secured. An evaporation of more than 9 lb. per pound of dry Issaquah screenings containing 11,400 B.t.u. per lb. was also obtained.

As a result of the readiness with which powdered coal can be used in handling overloads, because of the possibility of lighting and putting out fires quickly, it is quite probable that this fuel will be used quite extensively in the future. It is stated that the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has recently decided to install a powdered-coal burning equipment for a new 40,000-kw. station, to contain eight 1,308-hp. boilers to be operated at 250 per cent of their rated capacity continuously.

Although the problem of using fuel oil in the future is dependent upon the extent to which its cost is likely to rise, the author feels that the installation of oil-burning apparatus, making use particularly of mechanical methods for atomizing the oil, is worthy of serious consideration. This is especially true in the case of standby equipment. Details are given in the paper regarding five rather extensive tests made by the Babcock & Wilcox Company, making use of Lodi mechanical oil burners in connection with its boilers.

Summing up the information contained in this article it seems probable that it will be necessary to curtail somewhat further developments in the use of oil fuel. This leads to the greater consideration of coal, which will unquestionably be more extensively used in the future, both in stokers and in powdered form. There is a limited field for the use of sawmill refuse, but where it is possible to secure this fuel at approximately present prices it can unquestionably be used to greater advantage, and a more extensive use of it may develop a better and more efficient means of handling and burning it than we have at present.

Railway Situation Analyzed*

Investment Bankers' Committee Believes Eventually Electric Railway Securities Will Again Attain a High Investment Standing

THE real question as to the security of electric railway investment is not to be answered by the income statements they have shown. Electric railway securities are a good example of the kind of investment that has suffered most, for the present, from the war's effects. High labor costs, high material costs, high capital costs, combined with a low price for the product, transportation, could not possibly result in anything but discouraging statements. Since electric railroads perform a public service and are subject to regulation, they have not been able promptly to adjust the prices for their product to the cost, as competitive industries have done. Financial statements may indicate the progress that is made in readjustment, but sound judgment as to the real worth of investments in electric railways must go much further.

THE QUESTIONS AT ISSUE

Intelligent judgment of the future worth of street railways must be based upon the answers to such questions as the following:

Will there continue to exist a sufficient demand for the kind of transportation service that electric railways have furnished?

Is the automobile supplying this service and will it gradually supply the greater part?

Is it possible to charge fares that will pay the operating costs and leave sufficient margin to attract capital?

If there are fares that will do this will the public consent to the increase?

The mere putting of these questions suggests what is actually taking place. The sheep are rapidly being separated from the goats. Unquestionably there are roads, particularly small suburban and interurban lines, which, due to local conditions, are finding that the automobile has taken away sufficient traffic to make the remainder much too small to keep the line alive with any fare possible to collect. It is usually true, however, that these lines are the very ones that were unprofitable even when all conditions were favorable. The first effect of the discovery that there are electric railways that cannot be successful is to create doubt that any can be suc-

*Interim report made by Russell Robb, chairman of subcommittee on street railway securities of the standing committee on public service securities of the Investment Bankers' Association of America.

cessful, but so superficial a view is sure to be modified and the credit of sound roads is likely to be benefited through a confidence that is the result of intelligent analysis and real conviction.

There is a widespread feeling that since the advent of the automobile the electric road has lost a large part of its traffic. Studies of traffic statistics do not bear out this supposition. There has been a great amount of transportation created by the automobile and it has absorbed a part of the normal increase that would have come to the electric roads, but in city systems particularly studies show that with considerable uniformity electric roads are carrying many more passengers than they did ten years ago, or even five years ago, and are even furnishing many more rides per capita. In many cases this increase has occurred in spite of little increase in facilities because of the difficulty in attracting new capital.

Traffic Increasing Despite Automobiles and High Fares

In the great majority of places there is every reason to believe that the answer to the first and second questions will prove to be that there will continue to exist a sufficient demand for the kind of transportation service that electric railways have furnished and that the automobile, though subtracting something from what the electric road might have had, will not prevent the electric car business from growing.

Even a very large and a growing business will not bring prosperity with low fares. Costs of everything have about doubled. Doubled fares would be not more burdensome than items every one is meeting at every turn, and very many riders have twice the wages with which to meet them. If doubled fares were paid with the readiness that has been shown in retail purchases, it is safe to say that the street railway business generally would be more prosperous than it has ever been before.

Improvements in operation, however, the use of the light one-man car, the betterment of station efficiency and all the economies stimulated by adversity have made it possible for roads to approach a prosperous condition with considerably less than doubled fares. There was fear at first that increased fares would so reduce the riding that it might not be possible to charge the fare necessary to pay the operating costs and leave sufficient margin to attract capital. This fear is fast disappearing. Agitation and the stimulation of discontent with the increase do of course prevent the full benefit that might be obtained, but the experience has been that though there is at first a considerable decrease in riding when fares are increased the passengers carried gradually tend toward the number that rode before the increased fares were put into operation.

Whether the public will consent to the increasing of fares seems to be largely a question of the political advantages there may be in opposing the increase, and these political advantages depend very largely on local street railway history and the public relations established by the management. The modern street railway operators through frank disclosure of all the facts and a courteous attitude toward the public and its representatives do much to remove old time prejudices and to secure local and official support and fair treatment. The state commissions for the regulation of public utilities have very generally granted increases and there is a formidable list of cities with fares of 6, 7, 8, 9 and 10 cents now in force. In fact the cities where fares have not been increased above pre-war levels are in a rapidly dwindling list.

Ultimate Benefit from Present Trouble

It is not unlikely that in the end many electric roads will be found to have benefited from the very severity of the blow they have received. For many years before the war electric roads were suffering from their burdens. Costs had even then risen considerably and returns on capital were low, there were constant importunities to build extensions and to add service, taxes were increased steadily and paving burdens were laid wherever possible. The popular belief that the roads were enormously profitable was so strong that no denial was credited and regulating bodies seemingly dared not judge street railway situations on their merits because of the preconceptions of the public. The last six years have dissipated the fiction. It has become plain to the dullest that a public franchise has no peculiar power to produce surpluses from deficits. The willingness in some cases to abandon lines, in others to sell to municipalities, in others to rest in the arms of receivers have convinced the public at last that, like any other business, there are investment costs, receipts and operating costs, and that these are all determinable. Many state commissions have not only listened without bias to the street railway rate cases but in their decisions have admirably set forth the principles that should be followed in future treatment. The rate cases have established values which from now on will serve as starting points. Service-at-cost franchises are being worked out that will assure the security of the investment and regulate fares so that they will be no more than necessary, but still sufficient to keep the business healthy and progressive.

Your committee hardly looks for spectacular improvement in street railway credit or sudden rise in the values of their securities, but it believes that the change in the public attitude toward the business, the constructive work being done by the commissions, the clearness with which the basic facts of the business are coming to be understood are all working toward secure conditions for the industry and will result finally in income returns which even though moderate will, by their steadiness and surety, give again to electric railway securities their high investment standing.

Welding Economies

THE wear of journal boxes used on electric cars is chiefly at the pedestal guides. Frequently these wear entirely through at these points and on many roads the journal boxes are then scrapped. The Chattanooga Railway & Light Company is repairing worn journal boxes by welding ⅛-in. steel chafing plates into the pedestal guides. The cost of repairs made in this manner averages but 50 cents per box, while the cost of a new box would be at least from $6 to $10.

Another example of quick repair work done in the shops of this company is the welding of spouts to sand boxes. Extra sand boxes are rarely kept in stock and the replacement of a damaged box ordinarily takes several days. By the use of an Oxweld blowpipe broken spouts are quickly restored and the cost is less than 75 cents per operation.

Analyzing Kansas City Traffic

Fourth and Fifth Sections of the Beeler Report on Traffic Conditions Set Forth Limitations on Grand Avenue and Walnut Street and Make Remedial Recommendations

THE fourth and fifth sections of the report by John A. Beeler, consulting engineer, New York, on traffic conditions and methods of improving the service of the Kansas City (Mo.) railways deal respectively with the situations on Grand Avenue and on Walnut Street, both being important streets extending through the business district of the city. The various conditions which combine to slow up the movement of the cars are analyzed and recommendations are made as to changes in the number and location of passenger stops, double berthing, use of elevated platforms, limitation of automobile parking, intersection movement of cars, etc. Similar recommendations were made to improve the conditions prevailing on the streets covered in the first three sections of the report, which were treated in the Feb. 14 and April 3, 1920, issues of the ELECTRIC RAILWAY JOURNAL.

Grand Avenue, the street dealt with in section four of the report, is the one wide thoroughfare in Kansas City's business district. The report points out that this roadway is of sufficient width that street cars and vehicles should be able to make excellent progress, but because of congestion at the intersections and the large number of vehicles using the street all traffic is badly impeded. In addition, street cars are loading heavily in both directions when the congestion is worst, and with present loading facilities the stopping time is prolonged. Practically all lines operating on Grand Avenue are outbound and therefore subjected to heavy loading during the afternoon rush hour as they are receiving outbound traffic. The total number of cars passing over this street is not excessive nor is the unbalancing of traffic in the two directions large. The worst conditions exist between Thirteenth and Fifteenth Streets, where fifty-five cars are scheduled northbound and seventy-nine southbound during the hour between 5 and 6 p.m. At the five principal intersections with Grand Avenue, however, there are a total of 946 car movements scheduled during this evening hour, which is partly responsible for the slow speed prevailing on this street. At the Eighth Street intersection there are 241 cars scheduled to pass during the evening rush hour, which is more than at any other point in Kansas City. Yet this intersection is now occupied by cars but 50 per cent of the hour.

In commenting on this situation at the Grand Avenue and Eighth Street intersection the report points out that previous to the Eighth Street changes, described in an earlier section of the report, 203 cars were observed in a maximum hour, while a later count, after the changes recommended by Mr. Beeler had been installed, showed 240 cars passing through the intersection in the same period. This not only represented a gain of 18 per cent but showed that it is now possible to get the scheduled cars through, even though the number of cars making the right-hand turn has increased nearly 100 per cent. As a result of the changes in location of car stops and other improvements for facilitating the movement of cars, the crossing time was decreased for every kind of car movement required, westbound cars showing 33.7 per cent improvement in intersection efficiency, southbound cars 26.7 per cent and eastbound to northbound cars 18.5 per cent.

At the Fifteenth Street and Grand Avenue intersection a total of 171 cars passed through the intersection between 5 and 6 p.m., occupying the intersection 2,103 seconds, or 58.5 per cent of the hour. Car movements at this point were much slower than at Eighth Street, where 240 cars were passed in 2,155 seconds, or in practically the same time. The speed of cars in the Fifteenth Street intersection is also shown compared to that at Eighth Street. The crossing time per car at Eighth Street averages 10.2 seconds, while at Fifteenth Street the average is 12.5 seconds, which is over 22 per cent more. The large number of turning movements required is the primary cause of the lower speed existing at this intersection. It is shown that 34 per cent of the 175 cars scheduled through this intersection must make either the right or left hand turn, of which 24 per cent make the slow left-hand turn. Rerouting of lines so as to reduce the number of cars turning will minimize delays at this point. Until such changes can be effected double berthing and a slight rearrangement of passenger and positive stops will afford much relief.

The average speed of southbound cars between Seventh and Fifteenth Streets on Grand Avenue was found to be but 4.18 miles per hour during the evening rush hour. From Seventh to Eighth Street the cars averaged but 3.03 m.p.h. and from Tenth to Twelfth Street 3.93 m.p.h. The northbound cars, although these are less in number and some are not loading heavily, do but little better, as the average speed from Fifteenth Street to Seventh Street is only 4.83 m.p.h., while from Thirteenth Street to Twelfth Street it drops to 3.49 m.p.h. During the fifteen-minute period from 5:30 to 5:45 the southbound cars averaged but 1.64 m.p.h. between Seventh and Eighth Streets.

EFFECT OF VEHICLE PARKING SHOWN

Referring to the effect of vehicle parking along Grand Avenue, the report states that although the roadway has a width of 69 ft. from curb to curb vehicular parking often interferes with both vehicular and car movement. The greater width of street invites parking in double rows, and observations show that even during the heavy rush hour vehicles often stand in triple rows at the most congested point. A vehicular count taken during the morning rush hour at Twelfth Street shows that 1,251 vehicles passed through the intersection in one and one-half hours from 7:30 to 9 a.m., of which number 617 came from the north and 463 from the south. The striking feature is that at this morning rush hour jitneys constituted 59 per cent of the vehicles from the north and 27 per cent of those from the south. During the two hours from 4 to 6 p.m. 2,104 vehicles passed through the intersection at Twelfth Street. Of this number 955 entered from the north and 780 from the south. During the hour from 5 to 6 p.m., which is the maximum rush hour, jitney traffic constituted over 30 per cent of the total at this intersection. Similarly, at

the Eighth Street intersection, of 860 vehicles passing through the intersection, 32 per cent were jitneys. From the above it may be seen that a very large proportion of the congestion on Grand Avenue is due to the number of jitneys operating both north and south bound over this avenue during the morning and evening rush hours.

In order to determine the service rendered by jitneys a count of all automobiles was made at Twelfth Street and Grand Avenue. This showed that from 4 to 5 p.m. 951 vehicles transported 1,900 persons through this intersection, or at the rate of two per vehicle, including the driver. Included in the above total, 231 jitneys carried 527 passengers through this intersection, which is only 2.3 passengers per jitney. From 5 to 6 p.m., when the streets are necessarily congested, 353 jitneys crossing the intersection transported 1,501 passengers, or 4.3 passengers per jitney. During this period seventeen street cars, or 8.7 per cent, added to the existing service would have provided ample transportation facilities for all jitney patrons and the vehicular congestion would have been reduced over 30 per cent.

In general, the large number of vehicles moving north and south bound on Grand Avenue is the cause of much street car congestion and the slow movement of this service. Vehicles block the space between cars and sidewalks, especially when both cars and vehicles are standing at an intersection, so that pedestrians and street car patrons find it difficult to cross the street or board a waiting car. Intersections are congested and boarding movements are greatly delayed. Cars are slowed down and thrown off schedule. This results in poor service for street car patrons as well as congestion and slow speed for all vehicular traffic.

Measures Recommended for Relief

The measures recommended in Mr. Beeler's report to expedite traffic movement were as follows:

1. Arrange the rear door of all safety cars so that they may be opened by street collectors, enabling faster loading for this type of car.
2. Use raised platforms in the streets at seven important passenger stops in the congested districts.
3. Combine and relocate passenger stops so that boarding and alighting facilities will be improved, including double berthing arrangement at twenty-three locations.
4. Give Grand Avenue cars the right of way over less important intersection lines.
5. Reroute some of the car lines so as to reduce the number turning into and out of Grand Avenue.

As these recommendations are much the same as were made in connection with conditions treated in earlier sections of the report, and described somewhat in detail in the previous issues of the JOURNAL referred to, the details will not be taken up here.

The result of the recommendations as to stop changes in the section of Grand Avenue between Third and Twenty-seventh Streets, a distance of 2.25 miles, would be to reduce the number of passenger stops from fifty-three to thirty-eight. They would average 8.4 to the mile, as against 11.78 stops per mile under present operation. This is a reduction of 17 per cent. Positive stops on Grand Avenue would be reduced from thirty-two to eight. This would give the right of way to Grand Avenue cars over those of less important intersecting lines. Seven "slow" signs were recommended as safety measures to be observed by Grand Avenue cars.

Section V of the report deals with Walnut Street, which is a high-class retail thoroughfare. Operating on this street there are three lines which furnish service in both directions and four other lines which furnish service in one direction only. Between Tenth and Fifteenth Streets 75 per cent more cars are scheduled northbound than southbound, and from Eighth to Tenth Street there is an excess of 35 per cent in the opposite direction. This unequal distribution of northbound and southbound cars gives an unbalanced traffic movement that is a factor partly responsible for the congestion during the evening rush.

There are 944 cars scheduled through seven Walnut Street intersections during the evening rush hour. There are also a large number of right and left hand turning movements required at these principal intersections. This points to the obvious desirability of providing sufficient berth capacity and keeping the straight track open at intersections where large numbers of cars are turning. In this connection it is pointed out that the changes recommended and later installed on the Eighth Street lines brought about a decrease of over 20 per cent in the crossing time for cars making the right-hand turn at Grand Avenue and over 40 per cent for cars making the left-hand turn, while the average decrease for all cars was 17.5 per cent. This resulted in the crossing being unoccupied 3.5 per cent more of the time, despite the fact that 22 per cent more cars were passed through the intersection during the maximum hour. Recommendations similar to those for Grand Avenue were made as to the rearrangement of stops and a co-ordination of vehicular and street car movement by traffic officers for the Walnut Street intersections.

Time study made as to the running time of cars along Walnut Street between Eighth and Fifteenth Streets during the rush hour from 5 to 6 p.m. showed that southbound cars move at the rate of 4.62 m.p.h., while from Tenth to Twelfth Street they average only 3.08 m.p.h. Northbound cars in the first instance make but 3.57 m.p.h., while this is reduced to 2.41 m.p.h. between Tenth and Eighth Streets. The slowest speed observed was made by northbound cars between Tenth and Eighth Streets, where for a period of 15 minutes their speed was reduced to 1.45 m.p.h.

The location of passenger stops, their close proximity to each other, the lack of double berthing and the poor loading facilities, vehicular parking, congested street traffic and unbalanced routing of cars are factors all contributing to the slow car speed prevailing on Walnut Street.

Parking of Vehicles

On Walnut Street any parking of automobiles compels moving traffic to run so close to the car tracks that street car movements are retarded. Occasionally double rows of parked vehicles force the moving traffic on the car tracks at loading points. This prevents street cars from pulling into the berths, keeps patrons from reaching the cars and destroys regularity of service. The consequent delay of the street cars is the cause of much overloading which otherwise would be largely eliminated.

Between the hours of 4 and 6 p.m. 1,369 vehicles passed through the intersection at Walnut and Twelfth Streets, carrying a total of 3,343 persons, including the drivers. This is at the rate of 2.4 persons per vehicle.

Deduct the jitney and truck drivers, and less than two passengers per vehicle are carried. This vehicular traffic is a major cause of congestion, slow loading and consequent slow speed. At the intersection at Eighth and Walnut Streets 1,134 vehicles pass through in the rush-hour period between 4 and 6 p.m.

During the maximum evening hour the jitneys operating over Walnut Street through the congested district constitute over 50 per cent of the vehicular traffic in each direction. The vehicle passenger counts made show that an additional street car every five minutes would care amply for all the jitney passengers and would reduce the vehicular traffic movement 60 per cent in the heavy direction of travel. This gives some indication of the inefficiency of the jitney as a common carrier.

The recommendations made as to relocation and reduction in the number of passenger stops were shown to reduce the passenger stops from thirty-three to twenty-three, or about 30 per cent, and positive stops from twenty-seven to ten, with slow-speed signals increased from four to seven. The recommendations covered also the installation of double berth passenger stops at eighteen points on Walnut Street and three points where car lines are turning into Walnut Street.

Novel Type of Yard Locomotive

THE mechanical department of the Pacific Electric Railway has designed, built and placed in operation a new yard locomotive for use in the yards at the new Torrance shops.

The locomotive has a draw bar pull of 3,000 pounds with a weight of 22,000 pounds on the 32-in. drive wheels. The length of the locomotive is about 20 ft. A six-cylinder, 70 to 90 hp., automobile type gasoline



VIEWS OF A NOVEL TYPE OF YARD LOCOMOTIVE USING AUTOMOBILE ENGINE WITH A JACK SHAFT AS THE SOURCE OF POWER

engine is the power source for the locomotive. The engine is connected by a friction disk clutch and propeller to a jack shaft, to each end of which the side rods are attached by means of cranks and pins.

The locomotive is intended to be used solely in moving cars from one shop building to another or to and from the transfer table. It permits quick handling of disabled cars on dolly trucks.

The Ontario Safety League, Toronto, is sending to school children copies of letters from the Mayors of Canadian cities commending the work of the league and giving suggestions as to how they can assist in reducing accidents.

Invites Charter Members

Federated American Engineering Societies Ready for Business—First Annual Meeting of American Engineering Council in November

THE joint conference committee of the four "founder" engineering societies has just issued the following invitation to all engineering and allied technical organizations in the country:

The joint conference committee of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, acting as the ad interim committee in accordance with the authorization of the organizing conference held in Washington, D. C., June 3-4, 1920, extends to your organization a cordial invitation to become a charter member of The Federated American Engineering Societies and to appoint delegates to the first meeting of the American Engineering Council, of which due notice will be given, to be held in the fall of this year.

There has been previouly sent to you an abstract of the minutes of the organizing conference, at which there were in attendance 140 delegates, representing seventy-one engineering and allied technical organizations. It was the unanimous opinion of the conference that there should be created an organization "to further the public welfare wherever technical knowledge and engineering experience are involved and to consider and act upon matters of common concern in the engineering and allied technical professions," and that this organization should consist of societies or affiliations, and not of individual members.

On the basis of these fundamentals the attached constitution and by-laws were unanimously adopted by the conference. These contain full information concerning The Federated American Engineering Societies, the American Engineering Council, its executive board, and of the various officers and committees. The basis of representation therein stated for the American Engineering Council is one representative for from 100 to 1,000 members and an additional representative for each 1,000 members or major fraction thereof.

At the gathering in Washington,* which was the greatest event in the history of the engineering and allied technical organizations in this country, steps were taken which created "The Federated American Engineering Societies," which will have a far-reaching influence on the future of these professions. The fact that this action was taken without a dissenting vote indicates that the psychological moment had arrived and that there was a unanimous desire on the part of the representatives of these professions for the organization formed.

The joint conference committee, the ad interim committee, would ask each organization invited to take favorable action in the matter of membership in the organization at the earliest possible moment and to advise the committee promptly of the names of the delegates who will attend the first meeting of the American Engineering Council in November of this year.

The joint conference committee is confident that with the universally acknowledged need for such an organization there will be a prompt affirmative response to this invitation.

The committee has also recently issued its Bulletin No. 3, outlining in some detail the purposes of The Federated American Engineering Societies. This bulletin also outlines the various past activities of Engineering Council, at present consisting of representatives of six societies, A. S. C. E., A. I. M. & M. E., A. S. M. E., A. I. E. E., A. S. T. M. and A. R. E. A., and shows how the way has been opened for American Engineering Council, the operating organization of The Federated American Engineering Societies, to succeed Engineering Council and speak for the whole body of engineers and allied technologists on matters of general public interest and welfare.

The bulletin also answers the question as to what the federated societies intend to do and says in this respect:

*See ELECTRIC RAILWAY JOURNAL, June 12, 1920, p. 1213.

What it intends to do is to use its power for the service of the community, state and nation in public affairs wherever engineering experience and technical knowledge are involved and to consider and act upon matters of common concern to the engineering and allied technical professions.

In the conduct of many public matters which are essentially of an engineering nature it is vital to the public welfare that engineers and allied technologists should lead.

* * * * *

It is the duty of the engineer to take up public service work. It is incumbent upon him as a citizen to "do his bit," and there is the added responsibility due to his special knowledge and experience which is primarily of importance in the execution of public work.

The Federated American Engineering Societies will speak for a group of citizens who by reason of special training and knowledge represent a high order of intelligence, and who individually and collectively would be derelict in their responsibility for the talents they possess if they did not apply them unselfishly for the common weal.

In unity of action there will of necessity be strength and power.

Bulletin No. 4, just issued, gives a story of the Washington organizing conference as reflected by excerpts from the editorial and other comment in the technical press.

A comprehensive survey of the editorials, reports and comments which appeared in the technical press and society journals was published recently by the McGraw-Hill Company under the title "Engineers Unite."

The headquarters of the joint conference committee are in the Engineering Societies Building, 29-33 West Thirty-ninth Street, New York City, and various bulletins and items of information are gladly furnished upon request.

Junior Accountants Neglecting Opportunities

Spare Time Should Be Used for Study—Advancement Possibilities Real and Attractive —What Books Should Be Read

BY I. A. MAY

Comptroller the Connecticut Company, New Haven, Conn., and president American Electric Railway Accountants' Association

THOUSANDS of junior accountants in the street railway business have opportunities before them today that they little realize. It is a well known fact that the accounting done by steam railroads, electric railways and public utilities in general is more standardized, and we might say on a much more scientific basis, than the accounting in all other industries, except perhaps in some of the largest manufacturing concerns.

A junior accountant after passing through all of the accounting divisions of a fairly large electric railway little realizes that if he would use to advantage the spare time outside of the regular office hours in studying a few of the excellent accounting books now on the American market he would within a short time be in a position to pass the examination held in his state for the degree of C.P.A.

If he is successful in passing the examination positions are open which pay from three to five thousand dollars per year for junior public accountants and from five to fifteen thousand for senior accountants.

While the above figures may seem like a dream to the young accountant, yet they are facts, and I want to call your attention to other facts, namely, that in applying the spare time in studying accounting books they will find within a short time that their daily work appears to be very much easier as a result of the education and the training that they are receiving, and they will soon begin to apply the theory obtained from the books to their daily work, improving and bettering it in that way.

This improvement and betterment is bound to be recognized by their superior officers, and the chances are they will receive an increase from their present employers and, no doubt, promotion.

One of the greatest men of the last century, Mr. Gladstone, gives us the following:

Believe me when I tell you that the thrift of time will repay you in after life with a usury of profit beyond your most sanguine dreams, and that the waste of it will make you dwindle, alike in intellectual and in moral stature, beneath your darkest reckonings.

Some one has enlarged upon the above, and I quote as follows:

Any one who used his time to its best advantage between the ages of fifteen and thirty-five will surely be in a position to do what he likes with it from thirty-five on. If young men could realize this fact, every available hour would be given to study. When you waste your time in occupations and amusements that are unnecessary to body or mind do you know what you are throwing away? Let us enumerate a few of the things:

Freedom from anxiety in middle life and old age.

The best educational and social advantages for your children.

The treasures of art and literature which come with the leisure and cultivated taste of middle life.

Respect and influence in the community, which the best men treasure as one of their richest acquisitions.

The broadening and refining which result from travel in foreign lands.

The satisfaction of a well-developed and well-spent manhood.

What a price that is to pay for laziness or passing pleasures.

There are perhaps some who would not agree with this, but I believe every word of it and hope by calling the attention of junior accountants to this illustration that more attention will be given to study and to their work. Some readers might be interested in a list of books which I believe to be extremely helpful in the study of accountancy and a short list* is given below:

Auditing, Theory and Practice—Montgomery.
Corporation Organization and Management—Conyngton.
Corporation Accounting—Bennett.
Cost Accounting—Nicholson.
Accounting Practice and Procedure—Dickinson.
Principles of Depreciation—Saliers.
Office Management—Galloway.

In addition to the above I would recommend to those particularly interested in accountancy as a future the *Journal of Accountancy*. This journal has a students' department which is given over to accounting questions, answers and discussion of accounting questions. The journal is the official organ of the Certified Public Accountants and is published monthly by the Ronald Press, 20 Vesey Street, New York City. This company also published the above mentioned books, as well as other good accounting books.

For general all-around street railway education "Electric Railway Transportation," by Blake and Jackson, and other similar books may be obtained from the McGraw-Hill Book Company.

As president of the American Electric Railway Accountants' Association I pass this information along to all junior street railway accountants and to accountants employed in the various other public utilities. My advice is to begin immediately and work hard. Do not neglect opportunities which are right at hand.

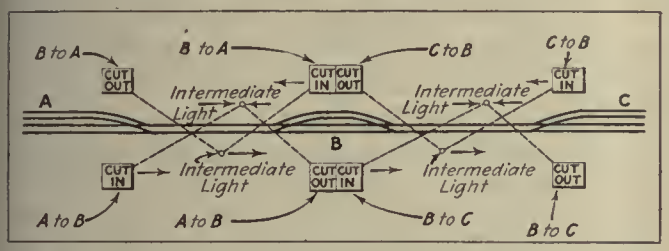
*Mr. May's modesty apparently prevents him from mentioning his own book, "Street Railway Accounting," the Ronald Press, which is the standard in street railway accounting practice.—EDITORS.

Dual Control Signals on the Pacific Electric

Improved Type of Signal Light Circuit Adopted for Single-Track Line to Minimize Hazardous Operating Conditions

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles

SOME of the single-track lines of the Pacific Electric Railway serve territory that does not demand frequent service. In some cases this territory is thickly settled and has a dense growth of orange trees through which the lines wind and which affords very little straight-away view for the trainmen. Due to the limited traffic on these lines a heavy investment for block-signal protection is not always advisable, in spite of the fact that the company takes a hearty interest in safeguarding the traveling public. The past practice



SINGLE TRACK LINE THROUGH ORANGE GROVES PROTECTED WITH NEW DUAL CONTROL SIGNALS

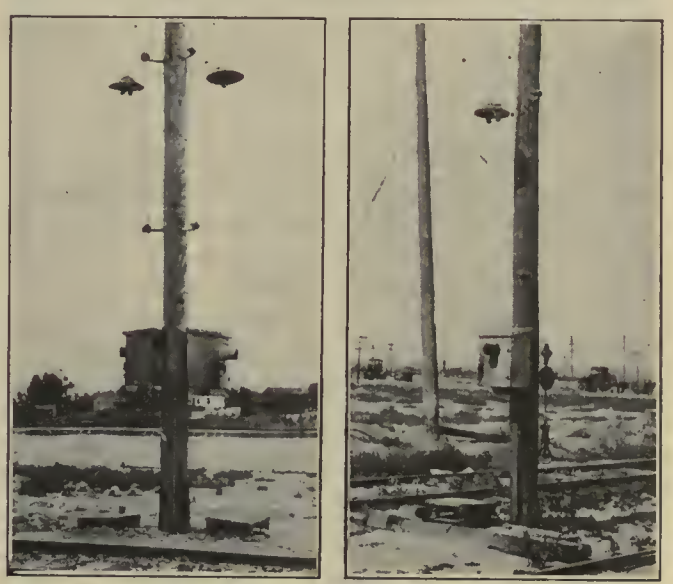
has been to protect certain highly traveled single-track lines with either all-electric automatic block signals or with a staff signal system. The less important single-track lines with limited travel and infrequent service have been protected with a single type of signal-light circuit controlled by a switch-light box at each end of the circuit. Recently this type of signal protection has been improved to what is known as dual control and has been developed in our engineering department.

An accompanying illustration shows a single-track line, with sidings, recently protected with this improved type of light circuit. The length of the protected line is approximately 10,000 ft. The illustration shows a tangent line, but in fact the line traverses territory densely covered with orange groves, a large portion of the line curving in and out among the groves. The double signal-light circuit with its intermediate signals was installed and placed in operation in accordance with the details shown in the drawing. The further details of its operation are explained as follows:

When a train inbound arrives at Station A and desires to proceed to the siding at B the conductor throws the signal-light circuit at the switch box marked "A to B cut in," thus setting the circuit against opposing trains at Station B, at switch box marked "A to B cut out." Upon arrival at Station B and wishing to proceed to Station C the conductor clears the line from A to B by throwing the circuit at box marked "A to B cut out" and throws the switch at box marked "B to C cut in." Upon reaching C the conductor clears the circuit at box marked "B to C cut out." In reverse operation when a train at C desires to proceed to B the conductor operates the switch in the box marked "C to B cut in." Upon reaching B the conductor clears the circuit at the box marked "C to B cut out" and operates the switch in the box marked "B to A cut in." He will cut out the circuit box marked "B to A cut out" upon reaching Station A. In accordance with the arrangement of the signal switch boxes, train crews will always use switch boxes on their right-hand side only.

The intermediate signals are located at the beginning and end of curves. When the train crew operates the switch to enter the circuit, this operation causes a green light to appear in the switch box, while a green light also shows up on the pole for the motorman's observation. This operation also causes a red light to appear in the opposing intermediate signal, as well as in the switch box at the other end of the light circuit, thus preventing two trains from entering the circuit at the same time. In case two trains should chance to throw the switch at exactly the same time red lights would show up in each box as well as on the poles at both intermediate signals.

An improved type of switch for controlling the new type of circuits was perfected. A walking-beam relay switch without its coils was placed in each switch box and a three-point double-pole, double-throw switch was connected at the top of the relay for operation either to the right or left as shown in switch-box cut. The installation of the switch on the relay was so devised and installed as to insure the safety of trainmen against



AT LEFT, SWITCH BOXES AND LIGHTS ON POLE IN MIDDLE OF CIRCUIT. AT RIGHT, SWITCH BOX AND LIGHTS ON POLE AT END OF CIRCUIT

shocks from excessive current entering the relay from the circuit. This was accomplished by inserting two removable redwood strips in front of the switch. These are easily removed for maintenance work. This safety precaution is also illustrated in the switch box. The cuts of two switch boxes and banks of lights on a pole in the middle of a circuit at which point another line branches off and a switch-light box and bank of lights on

a pole at the end of a circuit show method of installation. It will be noticed that the slatted platforms are anchored to the pole to prevent removal.

The improvement of the dual control type of light circuit over the single type is the elimination of confusion and misunderstanding of trainmen as to who has the right-of-way when two trainmen, one at each end of the circuit, simultaneously throw the switch-light circuit. This improvement reduces the hazard of accidents, should a trainman under such circumstances enter the old type of light circuit in the face of a possible approaching train, the crew of which has taken a similar action and proceeded through the circuit. The improved type of light circuit also eliminates frequent delays to the train schedules, due to the more positive method of assurance to the trainmen that the single-track line is clear. This type of circuit has also been successfully used by the company for operating exclusive single-track freight branch lines jointly operated with steam roads where the steam road line has been electrified for such joint operation.



AT LEFT, SWITCH BOX WITH SAFETY PRECAUTION FOR TRAINMEN. AT RIGHT, ARRANGEMENT OF SWITCH PARTS INSIDE BOX

Training Platform Men

New Plan at Los Angeles Involves Practical Instruction on Several Lines of a Division in Turn

By J. G. Jeffery
President East St. Louis & Suburban Railway
Director of Public Relations Los Angeles (Cal.) Railway

THE training of new motormen and conductors so that they will enter service thoroughly familiar with one line of a division and capable of handling it efficiently rather than begin with a general but hazy knowledge of all lines is the feature of an instruction system recently established by the Los Angeles Railway. The territory served covers 365 square miles, including annexed districts, so that car lines of considerable length are necessary for adequate service. Runs of from 14 to 21 miles are the rule, rather than the exception, so that the task of familiarizing new men with stops and transfer points assumes extensive proportions.

Formerly a new trainman was given three days' instruction in the general principles of car operation on one line. Then he would spend a day each on perhaps ten long lines and under as many different instructors. If he was assigned, after his "breaking-in" period, to the first line his knowledge with regard to it was apt to have become hazy, with resultant decrease in his efficiency. Further, while riding with ten different motormen or conductors in ten days, the new man might encounter a careless instructor who would trust to the next man to straighten out the learner on details he did not feel disposed to explain adequately.

Under the new system a new man spends from six to ten days on one line, under the same instructor. If he shows ignorance in punching transfers or any of the other details of operation the one man who gave the instruction is held responsible. Recruits receive one general instruction lecture before going on a car, covering the fundamental principles of good car operation.

Motormen are given instruction on a specially built car which shows the entire electrical equipment. After his training experience on a car the man is given other lectures on such matters as preparation of trip reports, accident data the company needs, method of procuring the names of witnesses and numerous other details.

The instruction department then turns the new man over to a division superintendent as qualified to man a car on the line on which he has received instruction. He is placed on that line and works a full shift for ten or fifteen days.

To apply the principle that the best training for a man is in handling a car and dealing with the public, the Los Angeles Railway executives arrange to have the new man take a morning rush-hour car on the run that he has studied, and then to spend the remainder or part of his time in learning the details of another run of the same division.

The length of time needed by a man to learn the new run naturally depends on himself, but in the end he is so trained that he can take it on regular duty. He can shift between the first and second lines to meet the service requirements and can then gradually learn other lines until he is capable of handling any one of them efficiently.

The new plan contemplates written examinations for new men instead of the present oral examination which is given in connection with the advanced instruction lectures.

A new trainman is paid $1.50 a day while learning to take a regular job providing he stays at least until the first pay day after he qualifies. After he has qualified to take a car on regular service he begins earning pay on the usual scale. When he begins training on a second or third run his pay is altered. He is paid for his morning rush-hour work on the regular scale, then while he is learning another line he receives 25 cents per hour. This is the scale for waiting time. It is higher than the rate paid during the initial training period, thus recognizing that the man is not entirely "green."

The average new man can become fully efficient on a half dozen lines of a division in fifteen days under the new system. The men take to it well and, on the whole, receive thicker pay envelopes than under the former plan. The "one-line instruction" has found favor with the officials of the Los Angeles Railway and has come to stay.

An appropriation of $85,000 has been authorized to the Bureau of Standards for the investigation of standards of practice and methods of measurements of public utilities, such as gas, electric light, electric power, water, telephone, central station heating and electric railway service and the solution of the problem arising in connection with standards in such service.

Bridgeport Traffic Analysis

Recent Report Shows Buses Alone Are Uneconomical—More One-Man Cars Recommended, with Bus as Auxiliary and Operated by Railway

THE Bridgeport (Conn.) Chamber of Commerce has just made public the "Report on the Most Satisfactory and Economical Method of Mass Transportation for Bridgeport," submitted to it about March 1, 1920[1], by Walter Jackson, consulting engineer. The report as printed is really an abstract by its author and occupies more than six pages in the Aug. 1 issue of the chamber's semi-monthly publication, the *Bridgeport Progress*. A copy of this issue is being sent to every important Chamber of Commerce in the United States.

The problem has been to study the Bridgeport transportation requirements of carrying about 150,000 people per day in a city whose population is 200,000 and to see whether either the bus or modern electric car alone or whether a combination of trackless and track vehicles should be used to meet these requirements.

Taking the bus operation alone, first, the report says:

> In view of the wonderful development of the motor bus, it will naturally be asked whether this more flexible means of mass transportation could completely take the place of the existing railway system, first, from a physical standpoint; second, from a financial standpoint. The answer must be that even the smaller buses are *physically* practicable. L. S. Storrs, like many other electric railway operators, holds that this cannot be done. However, this opinion is based upon the assumption that the bus must necessarily use the same thoroughfares as the street car. It is perfectly true that the existing bus services of Bridgeport do, with few exceptions, follow the same routes as the electric cars; but that policy of confinement to a few streets would not have to be followed by an organized bus monopoly.

The report then quotes London figures and traffic conditions[2] to show that narrow streets are not a bar to a large bus traffic, and then says:

> As a matter of cold-blooded fact, the buses of Bridgeport actually have been carrying 50 to 60 per cent of all the traffic at a higher schedule speed than the cars in spite of the rule that prohibits any vehicle from passing a standing car while interchanging passengers. If there were no cars at all, and effective regulations against parking machines along the curbs of Fairfield Avenue and of Main Street were maintained, it is obvious that there could be two lines of traffic in each direction instead of one. However, this advantage would not obtain with larger buses approaching street car width.

But turning to the question of financial practicability, the author says in the report that he has analyzed every possible kind of bus operation, including data obtained first hand from the Bridgeport bus operators themselves, and then adds:

> Before quoting any costs and deductions, it may be well to put the cart before the horse for once by stating that the leading busmen and dealers themselves realize that a city like Bridgeport could not possibly depend upon the present haphazard individual ownership scheme for reliable and economical bus transportation. If they had the job of laying out an all-bus system, they would form a co-operative company (as proposed by Schwartz) or a railway type of organization with uniformed men (as proposed by Mills)[3]. None of the bus advocates interviewed had, however, a true conception of the size of the problem and of the true costs. It is now in order to see what each kind of automotive equipment would accomplish.

Following this are statements of operating and revenue figures, as well as some traffic and operating details, for several bus lines in other cities, such as for the Fifth Avenue Coach Company of New York, the proposed Detroit 10-cent fare bus, the Chicago Motor Bus Company, the Baltimore Transit Company and the Rhode Island Omnibus Company. As most of the data and facts with reference to these companies have been given in these columns they are omitted here[4]. It is worth while, however, to quote one remark pertinent to applying these data to Bridgeport. In discussing the Fifth Avenue bus, the report says:

> As a matter of fact, two sixteen-seat Bridgeport buses at a 5-cent fare easily earn more than one forty-four-seat New York bus at a 10-cent fare. The 10-cent fare of this company is, of course, largely possible because of a visitors', shoppers' and healthseekers' clientele unparalleled in scope; it would not have a chance in Bridgeport. To get anything like the same revenue, it would be necessary to carry twice as many passengers, assuming that the average ride in Bridgeport was the same as in this largely short-ride traffic. Double the riding would be possible only if the top deck were enclosed, as American winters are not conducive to open-air riding. Another factor that militates against the use of a large double-deck bus is its slowness.

The report then discusses actual earnings and costs in Bridgeport. These have already been given in the columns of the JOURNAL more extensively and based on more complete and later information than those in the report[5]. As a result of the study, however, the following conclusion is reached:

> From all the data gathered in the field from bus operators and elsewhere from bus manufacturers, one must come to the conclusion that thirteen to sixteen-seat buses could hardly be run in Bridgeport for less than 20 cents to 25 cents a mile without allowing for the real taxes that an organized company would have to pay, also bearing in mind that everything would have to be kept to a higher standard and that many bus-miles would have to be run whether there was any traffic for them or not. It has been indicated that by taking advantage of additional streets, it would be physically possible to handle all present bus and car traffic. It cannot be gainsaid, however, that the resulting street conditions would not be improved for the pedestrians. In any event, the matter of physical limitations becomes purely academic in the light of the foregoing proof that if individually owned buses of this size cannot earn more than 20 cents to 25 cents a mile, they can hardly prove profitable if the overhead and running expenses are on the same order.

Subsequent to his conclusion that the buses could not give satisfactory service on a 5-cent fare within all or the greater part of the area of Bridgeport, the report examines the possibilities of what he terms "modernized electric car operation" and makes suggestions for the application of light-weight one-man cars to the Bridgeport traffic problem.

The question emphasized is not the increase in cost of electric railway operation, but rather whether "any resources of the art have been developed to offset this increase in cost, and, if so, to what extent the Connecticut Company has availed itself of these resources."

The report suggests that the Connecticut Company has done all that it can in saving power through the education of motormen and by means of power saving recorders, but that a far greater saving of power could have been possible through the earlier adoption of light-weight automatic one-man cars. The author infers that the Connecticut Company has been slow in the installation of equipment of this sort and states the belief that if the one-man car had been installed to a sufficient

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[1] Since this report was made two fare changes have taken place (see issues of April 10, page 777; July 24, page 193; July 31, page 244, and Aug. 7, page 294) and electric car service has been discontinued (July 26) (see issues of July 10, page 101; July 24, page 93; July 31, page 245, and Aug. 7, page 292.)—EDITORS.

[2] See ELECTRIC RAILWAY JOURNAL, Oct. 11, 1919, page 708; Feb. 28, 1920, page 425.

[3] See page 330 this issue.

[4] See ELECTRIC RAILWAY JOURNAL, May 29, page 1088; July 3, page 11; July 31, pages 209-218—"Fifth Avenue Bus," Tables XV-XVII; "Chicago Motor Bus," Tables XVIII-XX; "Baltimore Transit," Table VII; "Rhode Island," Table VI.

[5] See ELECTRIC RAILWAY JOURNAL, July 31, page 211, Table V.

degree and the 5-cent fare retained the jitney bus would have been automatically eliminated.

The report then includes an analysis of one-man car costs compared with two-man car costs and an estimate is given of what the effect would be in Bridgeport. The report then goes on to say:

Although the jitney bus has struck deeper root at Bridgeport than anywhere else except Newark, N. J., it is doomed to disappear against faster and more frequent electric car service as in other communities. The margin of profit in running a jitney bus is wiped out whenever the electric railway finds it possible to add 50 to 100 per cent more car-miles. Against a ten-minute car interval a bus driver may pick up twenty passengers on a half-trip; against a five-minute car service, he will be lucky to pick up fifteen, and fifteen will not be enough to make the business attractive. Although the Main Street safeties have been running only since Dec. 12, any one can see that they are hurting the buses. In the residential section, particularly, people now deliberately let a bus go by because they see one of the new cars right behind. If they will do this in the face of the convenient nickel fares of the bus, what chance will the latter have with a 5-cent fare on the car? Indeed, Leader Schwartz, who sees the handwriting on the wall, says the busmen will sell six tickets for 25 cents in that event. That element of the population which is supposed to be permanently against corporations is too small to keep the bus business going on a large scale, and many of these people will soon forget their grievances with the coming of better service and lower fares.

But the solution even with one-man cars could not eliminate the two-man cars entirely, as two-man car train operation would then be desirable or even necessary in order to handle rush-hour peaks.

And even with electric railway service "modernized," there is still room for the bus, the report says; even need for it, not as a competitor, not even necessarily as a direct money maker in itself. This means that buses are not adapted to exploitation by private operators. But they are often "economically justifiable if handled in co-ordination with the existing electric railway service." An example of a useful service is quoted, in that Warner Brothers, a corset manufacturing concern, had encouraged a direct "factory-to-home" bus service, by which some 500 out of 3,000 employees were routed by bus and saved about one-half the time ordinarily taken by electric cars and busy corners avoided. About twenty-three buses were in this service, now discontinued. Mr. Jackson then argues that if similar service were introduced to such an extent that 20 to 25 per cent of the rush-hour travel could be kept away from the Bridgeport busy center crossing, Main and Fairfield Streets, the traffic relief would tend to speed up the railway service.

There are then suggested five typical routes for buses, to fit certain detailed local conditions. The characteristics of these routes are of interest, as indicative of the field of the bus in such a community in co-ordination with the electric railway. In general, they fit the definition of serving districts in which no service by rail could be justified, or of providing crosstown service from certain residence districts to factories in which many persons from the particular districts are employed. One interesting route would be to a factory employing 2,200 people, and here a service of two or four times per day, except for an occasional bus, is suggested.

Mr. Jackson would make the bus routes flexible, having them run from certain districts to factories at time of travel to and from work and shift to shopping or business downtown districts for the other parts of the day.

But the interesting economical point of fares and transfers then comes up, and on this the report says:

If the various bus services outlined are given in co-ordination with the electric railway service it will be natural for the public to expect transfer privileges and the same scale of fares. As regards transfer privileges these ought to be kept down to the limit and used primarily only where the bus is an extension of the car route. Where the same section can be reached either by car or bus, the bus fare should be higher as part compensation for the superior speed offered. The special factory-home services should be handled at special rates of fare in accordance with the distance traveled.

It is not to be expected that even these special rates of fare will make the bus services self-sustaining, but if employees have voluntarily paid busmen 7½ cents a trip for better service they may be expected to do so where such service will be more reliable.

Anywhere from 50 to 100 buses could be used at the beginning. It might prove good policy to purchase these from the better class of bus owners and give them the opportunity to continue at this work if they saw fit to do so. The experience of some of these men would also be invaluable for the development of these services and for the working up of opportunity to use buses for mid-day shopping travel, for handling pleasure parties, groups of school children, etc.

While a 5-cent fare is theoretically possible for the entire city, the day of the blanket unit fare has gone. It is believed that the greater part of the public would be satisfied if the 5-cent (or other lowered) fare were granted for distances of 2½ to 3 miles, so that an increment of 2 cents per mile would be paid only by those taking the longest possible ride east-west or going beyond the city limits. There is no sound reason why Bridgeport should have to subsidize the back-country through lower fares when it has so much short-haul territory still to develop.

With reference to zone boundaries, it is suggested that equal length zones are not necessary, even though the public complains of discrimination.

The answer to this is that a zone system is only a zone system if the lengths of the zone vary in accordance with traffic conditions, density of traffic, rate of return and the like. Equal-length zones are practically unknown on the hundreds of foreign electric railways, whose experience with zone fares is as old as the electric and street railway business.

The suggestions are summarized as follows:

1. Operate all off-peak mileage with one-man cars.
2. Use two-car trains to help handle the peak traffic.
3. Use direct-routed buses at special fares to give faster rush-hour service while avoiding congested area.
4. Install bus lines for isolated parts in or near the city.
5. Restore the 5-cent fare to the greater part of the city car service, retaining a more elastic zone system for extra long rides.

Double-Deck Cars for Cape Town

THE J. G. Brill Company has recently delivered twelve new double-deck cars to the Cape Electric Tramways, Ltd., for use in Cape Town. The new cars are interesting chiefly because of the window sash arrangements. The windows are in pairs, separated by posts with an overhead hinged transom above. One window of each pair slides across the face of the other, which is stationary. The sliding sash is hung on a metal runway at the top and is easily manipulated. The window arrangement is identical on both upper and lower decks. The car seats thirty-two on the lower deck and forty-eight on the upper and has a total passenger capacity of 120. The car weighs about 24,600 lb. and has an overall height of 16 ft. 8 in. and a length of 34 ft. 9 in. It is equipped with maximum traction trucks with 4-ft. wheelbase with 33-in. driving wheels and 20-in. pony wheels.

New Sizes of Small Pneumatic Tools

Light-Weight, High-Speed Machines Can Be Used to Advantage in Cramped Places Where Heavy Machines Cannot Be Operated

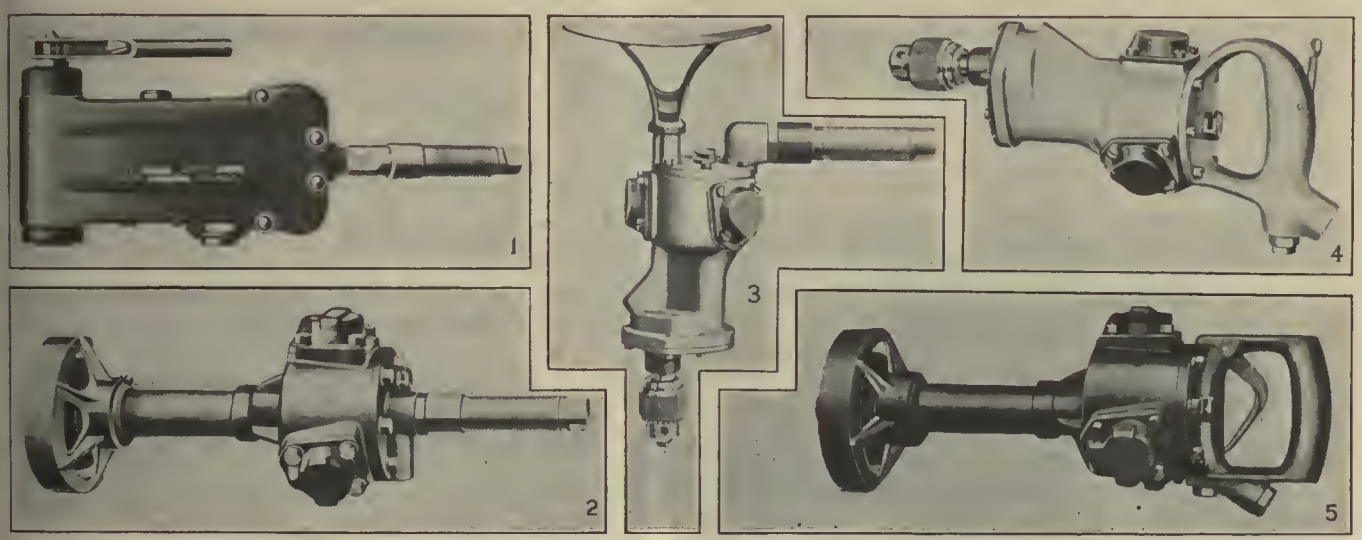
SEVERAL new sizes of small portable pneumatic tools have recently been added to the line of "Little David" pneumatic tools, manufactured by the Ingersoll-Rand Company, New York. The new tools include a small size of close quarter drill, to be known as No. 8; a small high-speed pneumatic grinder in two types, No. 601 and No. 602, and a light-weight drill furnished in two styles, No. 6 and No. 600.

These new tools have been developed to satisfy the demands for a light-weight, high-speed machine for certain classes of work, for which the heavier tools were not entirely adapted.

The No. 8 close quarter drill is a machine for use in certain classes of work where the ordinary machine is not suitable, as close to a wall or corner. This new machine has a fairly high speed, running at 250 r.p.m. without load, but will handle drilling, reaming or tapping up to 1¼ in. in diameter. The spindle which turns the drill, reamer or tap is operated by three rocking levers, connected directly to the pistons through connecting rods. The motor is of the three-cylinder type, with pistons acting at right angles to the levers. A very steady continuous movement of the spindle is obtained as one ratchet pawl is always in contact with a tooth of the spindle. The construction is very simple and sturdy, with least number of parts.

The No. 601 and No. 602 grinders are light-weight, high-speed tools running with a free speed of 4,200 r.p.m. and suitable for grinding, buffing or polishing work of a varied nature. Both machines have the same motor, but are equipped with different throttle and handle, the No. 601 having the closed type of inside trigger handle, while the No. 602 is fitted with the rolling type of throttle handle. A special feature of these tools is the three-cylinder motor, very different from that of the No. 8 drill, described above, which runs constantly in a bath of oil, insuring lubrication of all the parts. The valve is made integral with the crankshaft, and ball and roller bearings are used.

The No. 6 and No. 600 drills will handle twist drills from the smallest size up to ⅝ in. in diameter. The free speed at 90 lb. air pressure is about 2,000 r.p.m. The two machines differ essentially in the handle construction, the motors being the same. The No. 6 has the pistol grip type of handle, while the No. 600 is furnished with breastplate and rolling throttle handle. Aluminum, reinforced with steel bushings, is used wherever possible and results in a very light-weight machine, the No. 6 weighing only 9 lb. The motor is a three-cylinder type somewhat similar to that used in grinders above. The cylinders are separate iron castings, easily accessible, renewable and are interchangeable. A very sensitive throttle control has been obtained, which, with freedom from vibration, makes the tool ideal for drilling with small drills. The bearings are all either ball or roller type.



1—NO. 8 CLOSE OPERATION DRILL. 2—NO. 602 GRINDER. 3—NO. 600 DRILL. 4—NO. 6 DRILL. 5—NO. 601 GRINDER

What Shall We Do with the Other Fellow's Tokens?

THE problem of interchange of tokens of foreign lines, taken in fare boxes, is rising and must in the future become more of a problem than it is now, in all probability. The answer may be that the expense of interchange is greater than the loss; that, in the long run, the losses will equalize.

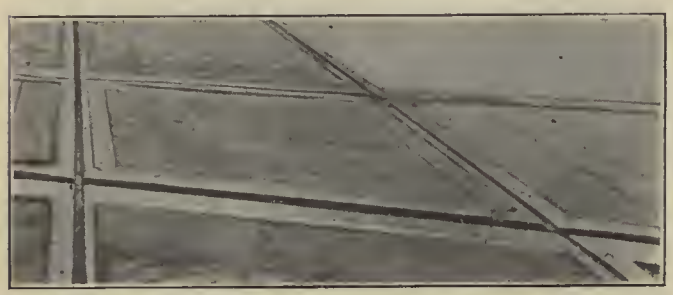
The Connecticut Company, for example, has something like 617,000 tokens out at its various sub-agencies and therefore largely in the hands of its patrons. The mere task of keeping track of all these and of checking the agencies is no small job. And, in the checking up of various returns to these agencies, tokens of other lines are appearing rather frequently. Tokens of this company, which, as is usual, soon become almost the same as legal tender in the immediate community, are doubtless carried away to other parts of the country and are used, unnoticed by the conductors, in the rush hours on other lines. Many of the tokens are so similar that they look alike in the fare box.

Shall the association establish a clearing house for tokens? They are worth all the way from 5 to 10 cents, and perhaps it would pay to clear them up annually, or even more frequently. It would be interesting to learn how important the question is; how many companies collect a noticeable number of foreign tokens.

Convenient Surface for Crossings

The Wilkes-Barre Railway Has Satisfactory Construction, Which Provides Accessibility for Tightening of Joint Plates

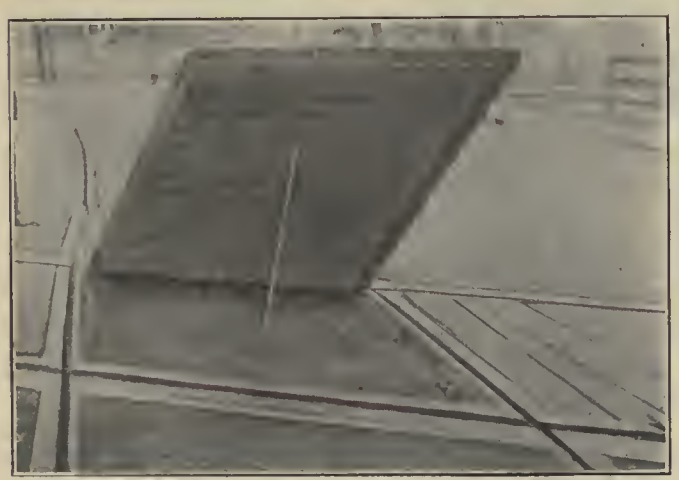
MANY different types of paving surface for railway crossings have been tried out. Those which provide the best surface for vehicular traffic are of such construction that occasional access to the crossing itself for tightening bolts is impossible without the breaking up and relaying of the pavement. The ordinary plank crossing is unsatisfactory in many respects. It has a very short life, does not wear evenly, and, if placed



UNIT CROSSING FLOORING IN POSITION AFTER SERVICE UNDER HEAVY TRAFFIC FOR FIVE YEARS

loosely, individual planks may fly out of position following the passage of trucks or other vehicles. Finally, although such a cover provides a certain degree of accessibility, the ends of the planks are frequently broken in the process of removing, so that it is necessary to replace them with new planks.

A type of construction which seems to have given excellent account of itself under service is that which has been in use for five years by the Wilkes-Barre Railway at an electric railway and steam railroad intersection and in a street which has exceptionally heavy vehicular traffic, especially heavy automobile trucks. This crossing construction is shown in two accompanying illustrations. The framework of the crossing is made of Z-bars, cut to the proper dimensions to fit the cross-



CROSSING FLOORING RAISED TO SHOW Z-BAR AND PLANK CONSTRUCTION AND METHOD OF SUPPORT ON KNEE BRACES

ing after the measurements of the angle have been taken. In the particular case illustrated, angle irons were substituted for Z-bars on two sides of the crossing. It will be noted that a slight depression has resulted at the sides where the angle irons were used. This crossing has, however, been in service for five years under very heavy service, and had Z-bars been used during this period it would in all probability be in first-class condition.

The bars are ⅜ in. thick and of a depth sufficient to accommodate 3-in. planks sawed into strips 3 in. wide. When these strips are cut it is made certain that the wearing surface will come on the end of the grain. The 3-in. planks are nailed together and then a wedge is placed in the center. The swelling of the wood under service makes the crossing tight. The top surface of the Z-bar has been roughened by the use of an acetylene welder in order to prevent slipping of horses.

As shown in one of the illustrations, lugs have been welded to the under side of the Z-bars, and when the crossing surface is in position these lugs rest on the knee braces of the crossing. The corner joints of the Z-bars are welded together. The plank surface is brush treated with carbolineum. In this crossing 5-in. 85-lb. rail-bolted construction is used.

Such a crossing as this is handled in exactly the same manner as an ordinary manhole cover. Two men with picks remove the flooring as a unit, tighten up the bolts beneath and replace the flooring in a few minutes. There are no spikes to pull, and there is no necessity of breaking the end of the planking, which in the ordinary plank construction is gouged out to provide a bearing on the track joint knee braces.

I. C. C. Needs Rate Experts

IN A statement issued by the United States Civil Service Commission it is said that the recently authorized general increase in freight and passenger rates, following the wage increase of railway employees, requires the Interstate Commerce Commission to add scores of expert freight and passenger rate clerks to its present force.

The Civil Service Commission states that to fill these positions examinations will be held throughout the country on Sept. 22 and Oct. 20 for tariff examiners under the Interstate Commerce Commission. The usual entrance salary is $1,620 a year, besides which appointees whose services are satisfactory will be allowed the increase of $20 a month granted by Congress. The higher administrative positions in connection with tariffs will be filled through promotion.

Full information and application blanks may be obtained from the Civil Service Commission at Washington or from the secretary of the United States Civil Service Board at the post office or custom house in any city.

Surface Contact System Abandoned

THE tramway system in Wolverhampton, England, which has been operated by the Lorain surface contact system for eighteen years, will be changed to the overhead wire system. Wolverhampton has long been noted as having the most extended surface contact system in existence. The reports from England state that the reasons for the change are not due to mechanical or electrical failures. It is brought about by the desire of the Wolverhampton corporation to operate through cars onto or from adjacent tramways, all of which use the overhead system. The cost of conversion, including construction of new track (20 miles), is estimated at £375,000.

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Fuel Service Order Extended

THE Interstate Commerce Commission has extended for thirty days Service Order No. 9, under which the electric railways, with other public utilities, can secure priority in the transportation of coal. This extends the period of the service order to ninety days from June 21. Further details of this order will be found on page 344 of this issue. A request for this extension was made by the American Electric Railway Association.

Executive Committee on T. & T. Meets

A MEETING of the executive committee of the Traffic & Transportation Association, the last to be held before the annual meeting except one just prior to the convention, was held in New York on Aug. 12. Those in attendance were W. H. Collins, president; R. P. Stevens, L. H. Palmer and T. C. Cherry. W. J. Harvie, representing the committee on collection and registration of fares, and Edward Dana, representing the committee on schedules, were also in attendance.

The purpose of the meeting was to consider the reports of the committees to be presented at the annual meeting. Drafts of the reports on schedules and on code of traffic principles were read, and Mr. Harvie outlined the report of the committee on collection and registration of fares, which is a joint committee with the Accountants' Association, and said that the report would be completed shortly. The secretary then gave information about the status of the other reports to be presented at Atlantic City.

It was decided to follow the same plan as last year of appointing a committee on subjects before the convention. This committee will canvass the live topics of interest to transportation men prior to and during the convention, so as to be prepared to submit a report for next year's work to the executive committee immediately after the convention. In this way association committees can be appointed promptly to take up the subjects selected, and more time will be allowed for a study of the various topics.

Attendance at Traffic Officers' Convention

MENTION has already been made that W. H. Maltbie of the United Railways & Electric Company of Baltimore is to present an address at the convention of the National Traffic Officers' Association in San Francisco on Aug. 23-27. This organization is an association of the traffic officers of the police departments in the different cities and one of the principal objects of the convention is to frame a model motor vehicle act to be placed before the various state legislatures and the provinces of Canada. It is understood that Mr. Maltbie, in his address, will argue in favor of the following:

Establishment of delivery (*i.e.*, congested) districts and one-way streets.

Licensing of all motor vehicle drivers.

Lights on all vehicles; horns or bells on all motor vehicles; compulsory signals before turns or stops.

Right of way as follows:

Emergency service, including public utility repair wagons.

Street cars.

Main thoroughfare traffic.

Except as above, right of way belongs to vehicles on the right.

Exclusion of pedestrians from streets except at crossings and safety zones.

Parking forbidden to block alleys, street intersections, fire plugs, entrances to private property, and street car loading berths. In delivery district parking limited to designated times and areas.

Parades limited to non-peak hours and excluded at all hours from delivery districts except by permit.

Blocking of car tracks by vehicles delivering or loading forbidden. End delivery forbidden in delivery districts. All delivery forbidden in delivery district during peak hours.

Slow-moving vehicles excluded from delivery districts during peak hours.

Left-hand turns forbidden in delivery district during peak hours.

Electric railway companies, which are especially interested in reducing street congestion and believe that the adoption of some such plans as those outlined would assist in relieving the traffic situations in their cities, might very well take these matters up with the police departments, chambers of commerce or other bodies in their cities which will be represented at San Francisco and acquaint them with these principles.

Standards Committee Holds Two-Day Meeting

THE Engineering Association committee on standards met in New York City on Aug. 5 and 6 to consider the reports of committees in so far as they contained recommendations relating to association standards. The members of the committee present were: H. H. Adams, Chicago, Ill., chairman; H. L. Andrews, Schenectady, N. Y.; C. H. Clark, Cleveland, Ohio; C. G. Keen, Philadelphia, Pa.; John Lindall, Boston, Mass.; H. H. Norris, ELECTRIC RAILWAY JOURNAL; Martin Schreiber, Newark, N. J.; W. C. Starkey, Mansfield, Ohio; N. B. Trist, Pittsburgh, Pa., and F. E. Wynne (representing N. W. Storer), Pittsburgh, Pa. During all or part of the meeting E. R. Hill, president of the association; J. W. Welsh, special engineer of the association; R. C. Cram, chairman committee on way matters; Daniel Durie, chairman committee on equipment; Charles R. Harte, chairman committee on power distribution; A. B. Stitzer, chairman committee on power generation, and F. W. Sargent, member committee on equipment, were in attendance. A summary of the actions on the recommendations of the several committees follows:

Committee on Way Matters—Report presented by Mr. Cram. On the adoption of a recommended uniform system of track spirals as presented, approved; on substitution of submitted designs of 7-in. and 9-in. girder grooved rails with curved heads for the corresponding present standards, approved; on revision of recommended specifications for plain bolted special trackwork, approved; on slight revision in wording in several sections of the Engineering Manual relating to way matters suggested to increase clarity, approved; on substitution of certain A. S. C. E. and A. R. A. rail sections for present standard sections, approved.

Committee on Buildings and Structures—On adoption as a "recommended practice" a set of suggestions regarding inspection and maintenance of buildings, approved. Mr. Schreiber explained the relation of these suggestions to the rules of the American Railway Engineering Association.

Committee on Power Generation—Report presented by Mr. Stitzer. On adoption as a "recommended practice" of a form of contract for the purchase or sale of power, referred to the convention for discussion before action by the committee.

Committee on Equipment—Report presented by Mr. Durie. On adoption as standards of submitted dimensions for steel wheels and wheel treads and flange contours, of submitted designs for limit-of-wear gages for flanges of ⅞-in. thickness and for several journal bearing and wedge gages, approved; on revision of standard specifications for solid wrought carbon-steel wheels for electric railway service, action postponed and matter referred back to committee pending receipt of information as to action on the same general subject by a joint committee of the A. R. A., mechanical section, and the A. S. T. M.; on adoption as standard of submitted gaging points and terms for wheels and tracks, approved; on revision of standards for brake-shoe heads and brake-shoe keys as submitted, approved.

Committee on Power Distribution—Report presented by Mr. Harte. On publication in the *Engineering Manual* under "Miscellaneous Methods and Practices" of a submitted revised specification and form of contract for electric conduit construction, approved.

In conclusion, the standards committee decided to include in this year's report the actions taken at the February, 1920, meeting, although these related to reports of standing committees which appeared in the 1919 proceedings.

Connecticut Company Section No. 7 Holds Annual Outing

THE annual summer outing of the Connecticut Company Section No. 7 was held at Momauguin on Aug. 5. Owing to the new fare rate effective Aug. 8 on the Connecticut Company's properties, many members were prevented from being present, therefore the attendance was not as great as in former years, there being ninety-nine dinner tickets sold.

The morning was given up to athletic events, consisting of a tug-of-war, the married men against the single men, same being won by the married men; 75-yard dash, sack race, fat man's race, relay race and baseball game, this last event being the principal feature of the day. The result of the score was Resolutes, 3; Shamrocks, 2. Special mention should be made of the home run by Henry Downs, superintendent of Westport, who came over the plate at a pace that would make "Maud S" blush.

Dinner was served at Theodore P. Swift's, Momauguin, at 1:30 p.m.

Safety Car in Europe

THE International Street & Interurban Railway Association has just issued a leaflet containing a digest of an article descriptive of the safety car, which appeared in a recent issue of the Dutch technical paper *Telegraaf*. The immediate cause of the bulletin was an accident which happened in Brussels owing to sudden illness of the motorman on a two-man car. The article describes the well known advantages of the safety car for city service and concludes: "In general it might be said that the operation of these cars has had a favorable influence on both the cost of operation and on the receipts."

Observation Car in Vancouver

THE British Columbia Electric Railway is now operating an observation car on its lines. The car is a double-truck flat car with cross seats, side rails and no top, attractively upholstered and lighted by arches extending across the car over the seats.

The car operates from May to October and makes about five daily trips in and about Vancouver. The twilight trip is said to be especially delightful. The route taken is through the industrial sections, residential suburbs, Japanese quarter and on out to Point Grey, Kerrisdale and Shaughnessy Heights. From the



VANCOUVER OBSERVATION CAR

latter point a beautiful view of the Fraser Valley and Mount Baker, 90 miles away, is obtained. The fare is 50 cents for the trip.

This company also issues an attractive illustrated folder entitled "Electric Trips Around Vancouver," which is full of valuable information for the tourist. The folder suggests trips to the adjacent beaches, to the city parks, to Fraser Valley and to attractive cañons and scenic beauty spots in adjacent territory. In all a five-day tour is suggested, with definite daily schedules.

Spain to Develop Water Power

THE Spanish Electricity Commission, appointed by the government in 1918, has made a report to the Ministerio de Fomento advocating the development of the national water power and its use through a high tension network for industrial and railroad electrification.

A single network covering the whole country is favored, as in the north high water occurs in the spring and summer, while in the south it occurs in the fall and winter, thus allowing a better use of the flood waters. Considering only developments of more than 20,000 the commission estimates the national water power at 2,000,000 kw., of which 500,000 kw. is in the Pyrenees, 200,000 kw. from the Ebro River, 150,000 kw. in Galicia, Asturias and Leon, 300,000 kw. from the Tejo River and the remainder from the southern rivers.

The electrical network will form an irregular quadrangle, with corners at Oviedo, Barcelona, Valencia, Granada, Sevilla, Alcantara. Feeder lines will be run to other cities. The total length of main transmission lines will be 3,000 miles, using 120,000-volt, three-phase, fifty-cycle current. All the lines are to be in duplicate on the same tower and the wires are in three standard sizes, 3 mm. x 100 mm., 3 mm. x 75 mm. and 3 mm. x 50 mm. The estimated cost exceeds 130,000,000 francs.

The state will regulate the development and undertake the construction, maintenance and control of the power transmission network. Rates will be fixed by the state on a cost-of-service basis, using a flat rate based on investment and independent of energy used.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Construction Started

City of Detroit Going Ahead with Municipal Line Despite Opposition from Property Owners

Plans of the Street Railway Commission of Detroit, Mich., for the construction of the crosstown line provided for in the Couzens system of municipal railways are meeting with opposition from home-owners on Eliot Street, one of the aristocratic down-town streets which the Charlevoix-Buchanan crosstown line is to traverse. The residents on Eliot Street contend that there are other streets near by given up entirely to business which can be used to better advantage.

Owing to complaints against the construction of the proposed lines on Burlingame, Clairmount and Owen Avenues, the city decided that the protests warranted an investigation into the possibilities of determining upon a less objectionable route. The railway commission will make a field survey and report to the Council on the advisability of using alternative streets for the lines. The commission was to pass a resolution next calling for bids on this second crosstown line, the Clairmount-Owen line. The complete system as planned to be carried out by the city is planned to include five crosstown lines.

Work Being Pushed

The Clairmount-Owen line is to connect the proposed Petosky Avenue line on the west side with a proposed north and south line on Conant Avenue, and will run easterly from Grand River Avenue on Joy Road, Clairmount, Owen and Holbrook Avenues, crossing Woodward Avenue on Clairmount.

Work is to be pushed on the St. Jean line, the contracts for paving, grading and foundation work involved in the municipal line having been approved by the Council. In answer to Councilman Bradley's question as to why the Detroit United Railway had been prevented from completing the St. Jean line and at the same time allowed to complete the Twelfth Street line, Chairman Ellis for the commission replied that the Detroit United Railway would not be allowed to resume operations on St. Jean since that work had been started by the Detroit United Railway and left practically dormant for three years, while on the Twelfth Street line work was nearly completed when the city gave permission to finish it.

The Street Railway Commission expects to complete the St. Jean line as soon as the Detroit United Railway would have done it notwithstanding that the Detroit United Railway promised to have it in readiness by Sept. 30. It is not intended to tear up the street until the project can be carried straight through to completion. Councilman Bradley charged that since the Detroit United Railway's operations were stopped on the St. Jean line, the city has done nothing and he objected to tearing up the street until the commission was ready to lay rails. The Charlevoix line was referred to. A trench was started the day after election, some concrete poured in and some pictures taken and nothing done since the contractor completed excavations near Alter Road. Mr. Bradley branded this as grandstand play which might just as well have been deferred.

Municipal Railway Denies Wage Advance

The budget committee of the City Council of Seattle, Wash., by a vote of six to three, recently denied the request of the trainmen of the Seattle Municipal Railway for a 25-cent increase in wages. While the men had asked for no definite increase, in informal discussion with Councilmen they indicated that a general wage raise of 25 cents a day for employees who have been in the service for more than a year was desired. The present scale calls for a daily wage of $4.75 for new men and $5 after the first six months, and $5.25 after the first year.

Proposals to raise the wage of the men were opposed by taxpayers who appeared before the committee. They declared the recent fare increase from 5 cents to 6¼ and 10 cents was put into effect with the understanding that there would be no additional overhead expense against the railway. Representatives of the men declared that the increase would not be a charge against the tax levy, but would be borne out of the operating revenues of the railway.

When questioned as to the effect of the proposed fare increase on the earnings of the railway D. W. Henderson, general superintendent, stated that the wage advance would add between $120,000 and $130,000 to the payroll. He urged that if any increase was adopted only two wage rates be provided for, $5 and $5.50. Members of the Council indicated that if it is learned at a later date that the new fare will materially add to the revenues of the railway increases for the car men might be considered by the Council at that time.

The men in their appeal also referred to the possible effect of jitney regulation in increasing the railway revenue.

B. R. T. Men Talk Strike

Receiver Garrison Refuses Demands for Pay Rise and Eight-Hour Day —Closed Shop Asked

Employees of the Brooklyn (N. Y.) Rapid Transit Company have announced that they will go out on strike if their demands for a substantial increase in wages and changes in working conditions are refused. Announcement that the men would take this action followed rejection of their demands by Lindley M. Garrison, receiver for the B. R. T. lines. Obtaining no satisfaction from Mr. Garrison the union officials have appealed to Federal Judge Julius M. Mayer, who is in charge of the company's affairs, for a hearing.

The present contract under which the men are working will expire on Aug. 28. On July 28 they presented to William S. Menden, general manager of the company, a new contract providing for an eight-hour day with a limit of twelve hours for those on swing runs, and time and one-half for all overtime. They also asked for a six-day week and a twelve-hour rest period after each day's work.

The wage scale which has been demanded by the men as included in their formal request is as follows:

For surface motormen and conductors, from 84 cents to 92 cents an hour, the present schedule being from 52 to 62 cents; for switchmen and car cleaners, 55 cents an hour; for Sunday and holiday work, 10 cents an hour extra.

For elevated motormen, 87 cents to 90 cents an hour, the present scale being from 54 to 57 cents; for guards on rapid transit lines, from 82 to 85 cents, the present scale being from 49 to 52 cents an hour.

Negotiations Useless

In refusing these demands Mr. Garrison stated that their acceptance by the company would mean an increase in the system's payroll of at least $15,000,000 annually. He also declared that it would result in a closed shop, to which he could not consent. In his letter to the trainmen's representatives the receiver said in part:

Under the circumstances there can be no point at this time in entering into any negotiations in regard to these proposed agreements. I have always refused to make a closed shop, I have always refused to enter into a contract with anybody other than a committee of employees. As you know I have taken this course under instructions from the court, whose representative I am.

Until the court changes its instructions in this respect it is useless to have any negotiations because I could not under the circumstances enter into any such agreement.

I recently, as you know, voluntarily offered an increase of wages which went to the limit of the financial means at my disposal. Even if you were asking me to modify merely the existing agreement with the employees, I could not possibly entertain the suggestions contained in the papers submitted. Under the most favorable construction of the different demands it would add a total of at least $15,000,000 to the existing wage payments.

Municipal Ownership Defeated at Toledo

People of Ohio City Unwilling to Sail the Uncharted Seas of City Ownership—Company Suit Still in Court

The twin bond ordinances authorizing the expenditure of $7,000,000 for a municipal railway and a bus system were decisively defeated by the voters of Toledo, Ohio, at the election on Aug. 10. The $3,000,000 ordinance to "acquire" a transportation system was lost by a vote of 8,535 in favor and 12,468 against. The $4,000,000 ordinance to "construct a transportation system" had a like fate. It received 7,901 votes in favor and 11,532 against. The first move to get the cost-of-service ordinance out of the Council committee on railroads and telegraph was made by Mayor Schreiber on Aug. 11 when he announced that he would ask Council to pass it at its next meeting on Aug. 23. This may insure the measure coming before the electors at the general election on Nov. 2 or at a special election before that time.

THE twin bond ordinances proposed by the municipal ownership commission for the settlement of Toledo's railway difficulties were in for a stormy career even if they had been ratified by the voters. This was evident the day before the election. The Toledo Traction, Light & Power Company, a holding corporation for the Toledo Railways & Light Company, the operators of the railway system, and several other electric and gas properties at Toledo, came into court after the suspension of the injunction against the twin ordinances had been granted by the Circuit Court of Appeals and asked leave in a motion to file an amendment and supplement to its bill of complaint.

Company Wanted City Enjoined

The amendment was deposited with the clerk for filing the day before the election. It brought the city of Toledo into the case as a joint defendant with the board of elections and offered much additional evidence seeking to make vague the validity of the bonds, should they be approved and issued.

The company held that the city had not complied with the state code regarding the publishing of ordinances in pamphlet form; that voters had been deprived of voting on the two ordinances between July 24 and Aug. 4 while the injunction of the District Court was in effect, and that already the action of the city had tended to depreciate value of company securities.

The company also asked the District Court to enjoin the board of elections from certifying the result of the vote on the twin bond ordinances, and sought to restrain the city from issuing any of the bonds the ordinances provide for and from levying any taxes under the measures.

Legal Question Before Court

The Circuit Court of Appeals at Grand Rapids last week did not pass upon any of the legal questions involved in the case as brought out in Judge Killits' court at Toledo. The circuit judges merely suspended the effect of the injunction.

The company has announced that twelve lines are not paying their own way at the present fare rates. Only five are operated at a profit. These five bear the burden of supporting the system and the gross profit is cut down to a very low figure, company experts declare.

The plan of the city, if the ordinance had been successful, was to appoint a commission to lay out the new system for Toledo. Many of the members of the commission relied almost wholly on the bus end of the proposed double system, and counted on the railway to remove its tracks whenever any move was made to dismember the present railway system.

The members of the cost-of-service commission and two of the three daily papers supported the cost-of-service plan as the logical way to protect the interests of both municipal ownership enthusiasts and the traction company. As stated previously, this plan may now be submitted at the November presidential election.

Bridgeport Continues Trolleyless

Jitneys are still running in the city of Bridgeport, Conn., and the trolley cars are still off the streets, two weeks and a half after they were withdrawn by order of the company's trustees. Storekeepers in Bridgeport report a loss of patronage of from 25 to 50 per cent since the cars stopped running, most of it due to the fact that the jitney routes do not extend out beyond the thickly populated areas of the city. The fact that women shoppers cannot carry bulky packages in the jitneys is also a factor in the reduced volume of trading, it is said.

Out of the welter of the present more or less haphazard bus service in Bridgeport is likely to grow an organizd bus system which will be responsible for maintaining dependable service. At least this is the promise of J. B. Schwartz, president of the jitney men's association. He says that within a few days a jitney bus operating company will be incorporated which will provide for transfers at 2 cents each. Mr. Schwartz predicts that the new corporation will include in its membership a majority of the present bus owners. He says that the tentative plans so far made by the men who will enter the new company call for the purchase of twenty-five buses of modern type, equipped with cash boxes. It is possible that the uniforming of operators will follow later.

According to Mr. Schwartz it is the intention of the incorporated company to maintain the 5-cent fare. He feels that the absence of officials at large salaries and the purchase of oil, gasoline, spare parts and general supplies at wholesale by the corporation will enable the individual bus owners to operate at a profit at the present rate. According to Mr. Schwartz a flock of inspectors are working all over the city to see that the buses are in repair; that the drivers do their work properly, and that the public does not suffer any unnecessary inconvenience.

So far as the Connecticut Company is concerned it again reported on Aug. 10 that "there is nothing new in the situation in Bridgeport."

In the other cities of the State the anti-jitney feeling is getting stronger. The Waterbury Chamber of Commerce issued a report on Aug. 10 advocating the removal of jitneys from all streets on which the Connecticut Company has tracks. The Hartford Chamber of Commerce has appointed a committee to take up the matter, and from what members of the committee say, it is expected they will recommend action like that of the Waterbury Chamber. The Norwich city authorities are also considering ways and means of curbing the buses.

Legislative Sanction Necessary

The Supreme Court of Iowa has just ruled in the Ottumwa Railway & Light Company case that a permanent fare cannot be fixed in a franchise without legislative sanction and that City Councils can change fares.

Cincinnati Wages Being Arbitrated

The trainmen in the employ of the Cincinnati (Ohio) Traction Company who are members of the Amalgamated Association are demanding an increase of 80 per cent over present wages, double time for overtime and other conditions. The present wage scale in Cincinnati is 2 cents an hour over the rate allowed by the War Labor Board. That body, in an award effective on Nov. 21, 1918, allowed the men an increase of approximately 30 per cent over then existing wages. On July 1, 1919, when the scale was reopened for adjustment, the company settled by giving a 2-cent increase, making the scale for trainmen 45, 48 and 50 cents.

The present demands are being arbitrated by George Dent Crabbs, president of the Philip Carey Manufacturing Company, who represents the railway; James A. Wilson, president of the Pattern Makers' International Union, who represents the men, and Prof. Alonzo Tuttle, a teacher of law in the Ohio State University. Professor Tuttle was appointed by the Industrial Commission of Ohio, which named him pursuant to terms of the contract between the company and the men. The arbitrators named by the company and the men had been unable to agree upon the third arbitrator.

W. Kesley Schoepf, president of the company, declared in his letter to the

union rejecting the demand that they are out of all proportion, and that under no circumstances would he approve expenditure on the part of the company that would add to the burdens of the car rider.

New Akron Franchise Drafted

A new franchise has been prepared by city officials of Akron, Ohio, for the city line of the Northern Ohio Traction & Light Company. It is said to contain in legal form all the points on which the city and company have agreed. Director of Law Hagelberger, City Manager Laub and E. E. Brownell, expert, prepared the draft.

The measure was submitted to the public utilities committee of the City Council on Aug. 7, and such changes as thought necessary will be made. Copies will be sent to the company. The franchise will be made public as soon as an agreement is reached by the city and the company.

It is reported that the franchise provides for an initial rate of fare of 5 cents. This will be increased or decreased at the end of stated periods to cover the cost of operation, make improvements and extensions, as the city may direct, and provide a return of 7 per cent on the company's stock.

At the end of each five years the city and company may agree upon a change in the return on the stock.

Pay Increases in Los Angeles

Effective on Aug. 16 the Pacific Electric Railway, Los Angeles, Cal., will increase the pay of all its employees, making an increased payroll of $900,000 a year. The increase is made by the company in recognition of good service on the part of the employees, and in the face of a growing deficit. Employees of the transportation, mechanical, electrical and maintenance-of-way departments will receive an increase of approximately 5 cents an hour. The new scale is as follows:

City service, 50 to 53 cents an hour.

Interurban single-track, 55 to 58 cents an hour.

Interurban double-track, 52½ to 55½ cents an hour.

Freight service, 62 cents an hour.

The Los Angeles Railway will also increase the pay of its trainmen and mechanical department employees on Aug. 16. The pay increases there total more than $500,000 a year. The Los Angeles Railway increases will be from 5 to 9 cents an hour and with the bonus system recently established employees who have been in the service two years or more may earn as much as 60 cents an hour. The new scale of that company for motormen and conductors will be as follows:

First three months, 50 cents an hour.

Remainder of first year, 51 cents.

Second year, 52 cents.

After second year, 54 cents.

Additional pay of 2 cents an hour will be added on shuttle lines, and 4 cents on downtown safety car runs.

Denver Union Men Defiant

Override Their Executive Committee and Indulge in an Orgy of Disorder—Federal Troops on Guard

The union employees of the Denver (Col.) Tramway were still on strike on Aug. 12 in defiance of their executive committee. This was in fact a reversal of a decision which had been made previously to return to work. On Aug. 7 the attorney for the union announced to Judge Whitford of the District Court that the strike had been called off by a vote of 973 to 3 in connection with the court's order. The union was given until Aug. 12 to "square its actions with its words." On Aug. 10 meetings of the union officials, other labor leaders, officers of the tramway and city and state officials were held. F. W. Hild, general manager of the company, announced that the company would take back those who had been on strike, except that certain individuals would not be re-employed, provided the men filed individual applications. The 58-cent scale will be paid pending the injunction proceedings in the Supreme Court. The men were given until midnight, Aug. 12, to file applications so as to maintain their seniority rights.

EFFORTS to have the union leaders negotiate with Mr. Hild were rebuffed by him. The company will not recognize or make any agreement with any labor union. On the afternoon of Aug. 11 a mass meeting of the union was held at which the executive committee recommended that the men go back to work and accept the terms offered by the tramway. The men refused to go back to work unless they were taken back in a body and the union was recognized. The vote on these matters stood at 771 to 36.

The tramway immediately issued a call to all other men who had applications for employment on file to report at once. It also began advertising for additional men.

Very Serious Disorder

Unusual disorders have attended the attempts by the company to operate cars. On Aug. 5 the operation of twelve cars was stopped by a mob of 5,000 men and women from the city's steam railroad shops and other unions. The crews of two cars in the downtown district were taken off the cars and beaten up by the mob and the cars demolished. Later the mob stormed the plant of the Denver *Post* and wrecked it. It then surrounded four cars in the residence section, tipped them over and smashed them up, beat up the crews and attempted to burn the cars. The police were unable to cope with the rioters.

Later that night the mob attempted to storm and burn the South Division carhouse, occupied by 150 strikebreakers; two of the rioters were killed and twenty-four wounded. The following day 2,000 citizens were sworn in as special officers and armed. No cars were run during the day. A mob at the East Division carhouse after menacing the property all evening rushed the place with bricks, pieces of iron and revolvers. They were fired upon by the guards. Three rioters were killed and fourteen wounded. Another mob made elaborate preparations for an attack on the South Division carhouse of the company at the same time.

The power and light wires to the carhouses were cut and dynamite bombs thrown into the car yards. An attempt was made to fire the carhouses. Another mob threatened the Tramway Building, but was held back by the police.

Troops Rushed to City

Early on Aug. 7 250 troops from Fort Logan were rushed to the city by motor trucks and took over control. The following day 500 regular soldiers arrived from Camp Funston, Kan., to augment the forces from the local fort. Each car was escorted by an automobile load of soldiers. Major General Leonard Wood arrived from Chicago on Aug. 9 to make a personal investigation of the situation.

More than 160 cars were operated on Aug. 10, but no trailers. Two hundred cars were operated on Aug. 11, or forty more than normal. There has been no rush-hour service since Aug. 9. The cars have been heavily loaded with passengers.

The company has approximately 600 strikebreakers on the system and has received sufficient requests for employment from former employees and new men to enable it to operate the full system very shortly.

Court Says Men Must Return

The District Court on Aug. 12 gave the executive committee of the union until Aug. 16 to persuade the men to return to work, or to resign as responsible heads of the union.

Full service was given on Aug. 13 on all lines, with the exception of one city route and one interurban.

No New Louisville Franchise Ready

W. H. Kaye, member of the executive committee of the Louisville (Ky.) Railway, announced to the Council during the week ended Aug. 7 that the company had no ordinance prepared at this time to offer as a substitute for the service-at-cost measure withdrawn by the company at the last Council meeting. William T. Baskett, assistant city attorney, said the city had no ordinance to submit.

Wage Increase in Richmond

Official notice of an increase in the wage scale of the trainmen of the Virginia Railway & Power Company has been made by C. B. Buchanan, vice-president and general manager, as follows:

The City Council having granted the 6-cent fare, effective on Aug. 1, 1920, and thereafter so long as the 6-cent fare is in effect, the wage scale of motormen and conductors will be: For men in service for the first three months, 43 cents an hour; for men in service for the next nine months, 45 cents an hour, and for men in service thereafter, 47½ cents an hour. "Safety car" operators will receive 5 cents an hour in addition to the above rates and scales.

In view of the fact that the company has not as yet applied for a 6-cent fare in Petersburg, as anticipated, it is deemed just that the same rate and scale as applies in Richmond, Norfolk and Portsmouth, where the 6-cent fare has been asked for and granted, be also made effective in Petersburg as of Aug. 1.

It is understood that should the company apply for a 6-cent fare in Petersburg, and the same should be denied, the old rate and scale will apply. Certain conditions have prevented the company from making the 6-cent application in Petersburg to the present time, but such action in the near future is probable. In consideration of the employees, however, the company decided that its failure to make the application should not be reflected in their wages, and the Petersburg scale, consequently, has been raised to the Richmond level, with the provision that the application, when presented, is accepted.

A Mighty Poor Advertisement

The Los Angeles *Saturday Night* published an editorial "Squelch the Trouble Breeders" in a recent issue. That paper said:

Recently, in the newspapers of this city, the Los Angeles Railway appealed to the public for fair play. The appeal had to do with the rerouting of cars in an effort to relieve congestion and to avoid the necessity of a fare increase. Those responsible for the rerouting of the cars, an action mainly due to the importunities of strap-hangers and the hostile attitude of certain newspapers, paid no attention to the prayer of the corporation. Instead, they redoubled their efforts to incite trouble and seemed to enjoy the experience of "eating their own word."

That a corporation should deem it necessary to appeal to those it is trying to serve for fair play is a mighty poor advertisement for the city. There seems to be a fault-finding "brick-throwing" epidemic on. The people, incited by inflammatory and hysterical newspaper articles, are kept in a constant state of irritation, well-meant efforts on the part of those criticised to remedy conditions are met with abuse instead of a helping hand, and officials who sincerely are trying to do their duty are denounced in vitriolic terms.

Something should be done to squelch the trouble breeders. It looks like another job for the Chamber of Commerce.

Wages Increased at Memphis

Judge McCall has authorized a new wage scale for employees of the Memphis Street Railway, previously agreed upon at a conference between the receivers of the company and representatives of the union. The order authorizing the increase was signed after a petition setting out the terms of the proposed contract was presented to Judge McCall by Lovick P. Miles, attorney for T. H. Tutwiler and F. S. Elgin, receivers of the company.

The increase is to remain in effect for one year from Aug. 1, 1919, to July 31, 1920, and will mean an increased expenditure on the part of the company of $150,000 a year. Under the new scale motormen and conductors who work nine hours a day are paid for the first year at the rate of 47 cents an hour, or $110 a month. Second year men get 52 cents an hour, or $131.68 a month. Third year men get 57 cents an hour, or $133.38 a month.

Under the old scale the monthly salaries were for first year men $101.79; for second year men, $105.30, and for third year men $112.32.

Similar increases for the men who work ten hours a day bring the first year men from the old rate of $113.10 to $122.20; the second year men from a rate of $117 to $135.20, and the third year men from $124.80 to $148.20.

Settlement Up to Mayor

Mayor J. E. Meyers of Minneapolis, Minn., has before him for action an emergency ordinance passed Aug. 6 by the City Council granting the Minneapolis Street Railway a 6-cent fare until Dec. 15 and a 7-cent fare with four tickets for 25 cents thereafter. The ordinance supersedes an ordinance granting a 7-cent fare at once, which was returned to the committee by the Council. The Mayor's position is problematical.

If the present ordinance becomes effective it is understood that the company will accept it and will grant the trainmen a wage increase as recently suggested by the board of arbitration. Possibility of the strike scheduled for July 1 unless the wage advance was granted still exists if the Mayor vetoes the ordinance.

In St. Paul the deadlock between city and company is still on. A physical valuation is under way and as matters now stand the City Council cannot grant the increase of fare voted by the people last spring until the company improves the service. The company reports that it cannot improve the service at the present trainmen's wage. The trainmen of the St. Paul City Railway are still waiting for the city to act on an increased fare so the company can pay the wage suggested by the arbitration board.

Democrats for Home Rule

The Democratic state platform in New York contains the following planks on public utilities and increased rate regulation:

We favor the regulation of public utilities so that sufficient and safe service may be rendered the public at a cost which will yield not more than a fair return upon the capital actually and honestly invested.

We favor investing the Public Service Commissions with sufficient power to enforce their own orders and suspend proposed increased rates during investigation by the commissions.

We favor the enactment of legislation, defeated at the last session of the legislature by the Republican senate, placing upon a public utility corporation demanding increased rates the burden of proof to show the reasonableness of such proposed increases, and removing that burden which now rests upon the public.

We are opposed to legislation permitting state commissions to impair or modify contracts made between cities of the state and railway companies fixing rates of fare. Measures violating this principle were strenuously advocated by Republican legislators and by a Republican speaker of the Assembly in 1919 and 1920. Any modification of such contracts should be made by the contracting parties in accordance with the majority sentiment of the community affected, and they should not be abrogated by the interference of state agencies.

Short Strike in Auburn

The demands of 161 striking motormen and conductors of the Auburn & Syracuse Railroad, Syracuse, N. Y., have been met by the company and service was restored on Aug. 8 in the city of Auburn and on the suburban line to Syracuse.

The men struck on Aug. 4 after notifying the company that if immediate action was not taken to increase their wages they would quit. The officials did nothing immediately and the men kept their word. On Sunday morning a conference was held between Patrick H. Downey, state mediator; City Manager John Jaeckel of Auburn and Attorney Frank M. Leary, representing the Amalgamated Association. Lawrence Lippitt represented the company.

Motormen and conductors on the city lines in Auburn will receive 60 cents an hour as maximum, starting at 56 cents, three months later 58 cents, to continue for nine months before reaching the maximum.

Men employed on the suburban lines will receive 62 cents an hour maximum. Freight and express men will get a rate 3 cents an hour higher. Freight warehouse men will receive 50 cents an hour and substation operators $5.20 a day. Shop men now receiving less than 50 cents an hour will be increased to that rate.

Court Decides Against Eighty-Cent Gas Law

The Consolidated Gas Company, New York, N. Y., won its long fight on Aug. 4 against the 80-cent law when a decree rendered by Judge Learned Hand, in the Federal District Court at New York, granted the company the right to charge $1.20 for every 1,000 cu.ft. until March 1, 1921.

The injunction restraining city, county and state officials from enforcing the old gas law of 1906, which has been in effect, lasts, however, for five years. After March 1, it is understood, unless the Supreme Court reverses Judge Hand's decision, he will set the price the company may charge from that time on. The new rate became effective at once. The excess over present rates paid by consumers will be placed in trust until a final decree is rendered by the Supreme Court if the defendants appeal.

Temporary injunctions restraining the state, county and city authorities from enforcing the law were granted by the Federal District Court on June 29, as noted in the ELECTRIC RAILWAY JOURNAL of July 3, page 36.

Seeks to Restrain Operation

The city of Martins Ferry, Ohio, filed a petition in the federal court at Columbus on Aug. 4 asking the court to enjoin the Wheeling (W. Va.) Traction Company from operating in the city of Martins Ferry.

The petition asks further that the company be required to remove its tracks, poles, wires and other equipment and property used in connection with its railway from the streets and to leave the streets in proper condition after so doing.

The petition sets forth that fares were increased in June, 1919, contrary to provisions of the franchise, from 5 cents to 10 cents between Martins Ferry and Wheeling and Martins Ferry and Bellaire, and that the company now proposes to increase rates again to 12 cents cash, with a 10-cent ticket fare, between Martins Ferry and Wheeling, and to 16 cents cash, with a 13⅓-cent ticket fare, between Martins Ferry and Bellaire.

The old franchise under which the company operated expired on Aug. 2. Federal Judge John E. Sater will return to Columbus on Aug. 15 to consider the case.

News Notes

Trackmen and Oilers Strike.—Trackmen and oilers employed by the Monongahela Valley Traction Company, Fairmont, W. Va., went on a strike on Aug. 2 for an increase in wages. The men are asking an increase of from 38 cents to 50 cents an hour.

Mr. Young on Engineering Council.—The American Society for Testing Materials has appointed C. D. Young as its representative on Engineering Council to succeed Albert Ladd Colby. Mr. Young is general supervisor of stores of the Pennsylvania System, and vice-president of the American Society for Testing Materials.

Fire Destroys Bay State Cars.—Twenty cars belonging to the Eastern Massachusetts Street Railway, Boston, Mass., were destroyed in a fire which burned the company's carhouse at North Abingdon, Mass., on July 26. The cars destroyed included nine of the double type, three short cars, five snow plows, a line wrecker, a sand car and a flat car.

More B. R. T. Tubes Open.—Two new subway tubes under the East River, New York, N. Y., one connecting Manhattan Island with Brooklyn and one connecting Manhattan Island with Queens, opened on Aug. 1. Both are to be operated by the Brooklyn Rapid Transit Company. The opening of these rapid transit lines will place in operation construction costing $36,000,000.

Chelsea Wants "L" Service.—A movement is under way among citizens of Chelsea and Revere, Mass., looking to the furnishing of electric railway service to these communities by the Boston Elevated Railway. The towns are now served by the Eastern Massachusetts Street Railway, which, under the proposed plan, would discontinue operation of the lines. The Chelsea division is said to be operated at a loss.

Delays Work in Radials.—The Ontario Hydro-Electric Power Commission has informed the Ontario Government that it will not make any further commitments on radial railways, pending the report of the royal commission appointed to investigate the radial projects. The commission claims to have misunderstood the Government's request at first, and to have gone ahead with some details of the radials in the District of St. Catharines. However, the possibility of friction has now been removed.

Work Started on New Terminal.—Work has begun on the Washington, D. C., terminal of the Washington, Baltimore & Annapolis Electric Railroad. It is the intention of the company ultimately to build a $2,000,000 station and hotel, but for the present the land recently acquired will be cleared of buildings and tracks laid so as to discontinue the practice of making the terminal stop in a public street. The new terminal is within a block of the heart of the business section of Washington.

Editorial Reprint Sheet Issued.—The Illinois Committee on Public Utility Information has published under date of July 15, 1920, Editorial Reprint Sheet No. 2, containing fifty-three editorials from various newspapers in Illinois. These comments express the viewpoint of the people in widely separated municipalities throughout the State on all phases of public service work. A cursory glance at some of the remarks contained in these editorials proves how anxious the public is for the growth of all modern utility even though the price paid for it must necessarily be high.

Chicago Officials Play Golf.—The officials of the Chicago (Ill.) Surface Lines recently enjoyed the first golf tournament of the season at the Harlem Golf Club. Practically all of the executives, from President Henry A. Blair down, joined in the contest. About three such outings in the summer have become one of the customs of the company. The winner of the first tournament this year was M. B. Orde, treasurer, who had the low gross score of 85, against par 71. Mr. Evenson, assistant to the superintendent of transportation, was also a prize winner, with the low net score of 72.

Improvised One-Man Cars Cause Strike.—Ashtabula, Ohio, is entirely without local railway service due to a strike of the employees of the Ashtabula Rapid Transit Company declared on Aug. 4. The men left their jobs because of an order posted on Aug. 3 putting into effect a one-man crew system. This was done as a retrenchment measure. The railway has been purchased by the city, but the transfer of the property to the city has not yet been completed. A statement from the men said they did not consider the cars adequately equipped for one-man operation.

To Fill Traffic Vacancy.—The United States Civil Service Commission announces for Sept. 7 an open competitive examination to fill the position of director of traffic. A vacancy at Curtis Bay General Ordnance Depot, Maryland, at $2,200 to $2,600 a year, and vacancies in positions requiring similar qualifications throughout the United States at these or higher or lower salaries will be filled from this examination. The duties of the appointee will consist of the organization and supervision of traffic details of outbound and inbound freight, movements by rail and water, and handling the railroad operating force in the depot.

Pay Rise for Queens Men.—William O. Wood, president and general manager of the New York & Queens County Railway, New York, N. Y., has announced an increase of approximately 10 per cent in the wages of the road's conductors, motormen and inspectors in the operating department and shopmen and linemen in the repair department. This will add in the neighborhood of $25,000 a month to the company's payroll. The increase was made voluntarily without any demand by the employees. In a recent communication to the Queens Borough officials Mr. Wood said the company was not making its operating expenses and that it was carrying passengers at a loss and for that reason it would be impossible to make repairs to its tracks and repave streets as ordered by the Borough President.

Electrical Workers Get 15 Per Cent Increase.—An increase in wages of 15 per cent to electrical workers employed by the Toronto (Ont.) Suburban Railway is recommended by a majority report of the board of conciliation which inquired into the dispute between the company and this class of its employees. The recommended increase is to all employees who are now paid upon an hourly basis. In regard to all employees who are paid by the month it is recommended that they should all receive an increase of $10 a month. When employees are called upon to do extra work they are to receive a minimum time allowance of not less than two hours, but only one minimum allowance shall be paid for in any one day. It is also recommended that seniority coupled with efficiency shall be the basis of promotion. The report is signed by Judge A. Barron, chairman, and George Kelley, the representative of the company. Louis Braithwaite, the representative of the men, in a minority report, objects to the findings and recommends a higher rate of wages for the electrical workers.

Financial and Corporate

Utility Securities Analyzed

Cost of Money Excessive—Confidence Must Be Restored to Avert a National Calamity

The First National Bank of St. Louis recently made an interesting analysis of public utility finances and rate of return. This analysis points out the fact that in economic history prices pass through periods extending over several years, in which the level is upward or downward. Custom is a strong force in controlling prices, and governmental regulation only adds another force to restrain any change in price. The combined condition of customary price and governmental regulation is found in the case of public utilities. What is the situation, then, of many of our public utilities under prevailing conditions of an increasing price level, a regulated rate of return, an unsympathetic public, a selfish capital, seeking, as always, the best possible investment, with an increasing number of bidders for the use of capital and a decreasing amount of capital for sale?

Cost of Money to Public Utility Corporations

In the first place, there is a tendency toward a deterioration of the physical plant and force. In the second place, extensions cannot be made with accustomed and desirable regularity, due to the high prices and dearth of material and labor, the reduced earnings, and the lack of new capital. In the third place, the most significant of all of these effects is the refusal of new capital to flow into this field.

The credit of public utility corporations on the whole is at present more or less in disrepute so far as the general investor is concerned. The highest grade of American public utilities can be purchased in the open market at a basis that will yield the investor anywhere from 1 to 2 per cent per annum more than the same sum would yield were the investment in any other similar grade of corporation security. The published table shows the changes in bond yields since before the war.

The average yield on seventeen of the highest grade public utility securities between April, 1919, and December, 1919, was found to be 6.11 per cent. The average yield of seventeen utility securities from January, 1920, to May 1, 1920, was found to be 6.75 per cent. On the other hand, the average yield of 3 highest grade railroad bonds from April, 1919, to December, 1919, was found to be 5.52 per cent. The average yield from January, 1920, to May 1, 1920, was found to be 5.75 per cent, thus showing that even the highest grade first mortgage public utility securities have recently been selling at a price which would yield the investor a full per cent more income per annum than could be obtained from the same class of railroad securities. In addition to this, the new securities of a growing concern seldom rank as high in regard to the securities behind it as do the seasoned issues secured by first mortgage on the property. How seriously this is handicapping the development and maintenance of public utilities is evidenced by the following table:

COST OF MONEY TO PUBLIC UTILITY CORPORATIONS, EXCLUDING MARKETING PROFIT TO UNDERWRITERS—BOND YIELDS

Period—Jan. 1, 1919, to May 14, 1920

	Yield, per cent
(a) Average yield on twenty-three representative issues of $1,000,000 and over, offered to the public between Jan. 1, 1919 and July 1, 1919	6.86
(b) Average yield on twenty-four representative issues of $1,000,000 and over, offered to the public between July 1, 1919, and Dec. 1, 1919	6.90
(c) Average yield on seven new representative issues of $1,000,000 and over, offered to the public in January, 1920	7.10
(d) Average yield on eight new representative issues of $1,000,000 and over, offered to the public in February, 1920	7.11
(e) Average yield on seven new representative issues of $1,000,000 and over, offered to the public in March, 1920	7.59
(f) Average yield on seven new representative issues of $1,000,000 and over, offered to the public in April, 1920	7.62
(g) Average yield on five new representative issues of $1,000,000 and over, offered to the public in May, 1920	7.83

Bond Yields	June, 1920	May, 1920	Jan., 1916	July, 1915	Before War
U. S. average 5 public utility	8.60	8.19	5.18	5.31	5.09
U. S. average 5 railroad	6.14	5.86	4.51	4.71	4.42
U. S. average 5 manufacturing	6.41	5.92	4.89	4.99	4.93

In conclusion the article states that public utilities can be punished only at the expense of the general public. Improvements in regard to the condition of public utilities cannot be expected until their properties afford as attractive a field for capital investments as that offered in other fields of business enterprise.

Receiver Pays 10 per Cent for Money

The petition of the Jacksonville (Fla.) Traction Company, granted by Judge R. M. Call of the United States District Court, Southern District of Florida, on July 27, to issue certificates of indebtedness amounting to $143,690, with interest not to exceed 8 per cent, was nullified on July 31 by order of Judge Call. A supplementary petition of E. J. Triay, receiver of the company, to issue certificates of indebtedness amounting to $65,000 and bearing interest at 10 per cent, was granted. The company found that it was impossible to sell the certificates of the company at an interest rate of 8 per cent and the additional petition was filed and granted. However, permission of the court is given only to issue certificates to the amount of $65,000, the estimated cost of paving. The sum of $78,690 which it was stated in the first petition was necessary for the payment of the State, county and city taxes is not provided for in the order granted on July 31.

American Railways Readjustment Plan Amended

Announcement has been made of an amendment to the plan submitted under date of July 31 for the acquisition by a committee of the holders of the 4-6 per cent bonds of the National Properties Company of all of the common stock of the American Railways, Philadelphia, Pa., now deposited as security for bonds of the National Properties Company for a cash subscription of 17½ per cent of the face value of the National Properties Company bonds, for which each subscriber will receive a like amount of 7 per cent income bonds of the American Railways. Upon the acquisition of common stock of the American Railways, and the distribution thereof, the bondholders will become common stock holders of the American Railways to the full amount of the stock now deposited as security for their bonds provided they pay the subscription. This subscription will provide the American Railways with cash to an amount estimated to be not less than $900,000. This amount is immediately required to take care of accounts payable by the American Railways and its subsidiaries.

In addition to these accounts the American Railways owes about $3,500,000 of notes payable to banks and bankers. The plans further provide that this amount shall be converted into five-year 8 per cent notes secured by bonds of a subsidiary company to the extent of about $4,550,000, thus funding the debt of the American Railways for five years.

It is announced that more than 90 per cent of the creditor institutions have accepted the plan of the committee subject to the American Railways being provided the $900,000 in cash under the plan of the bondholders' protective committee. The plan will not be operative, however, unless the additional working capital is paid in. Such depositing bondholders as are unable or unwilling to provide funds for additional working capital will receive 30 per cent of the face of their bonds in common stock of the American Railways, and their place will be taken and cash provided by an underwriting syndicate.

Good Middle West Report

otal Income for Fiscal Year of $2,463,567, While Expenditures Amount to $265,949

For the year ended April 30, 1920, ne Middle West Utilities Company hows a total income of $2,463,567. he expenditures amounted to only 265,949. The balance was $2,197,618. nterest on notes, bonds, etc., makes a otal of $1,126,975. The net income for he year was $1,070,643, to be carried to he surplus account. The proportion of he subsidiary companies' aggregate ndistributed surplus accruing to the Middle West Utilities Company was 206,176. This made a total combined urplus of $1,276,819.

SUBSIDIARIES DO WELL

The gross earnings of the subsidiary companies show an increase over the previous year of $4,721,638, of which amount $197,202 was contributed by new properties. The earnings of the North West Utilities Company were included this year for twelve months, whereas that company was owned for only four months of the previous fiscal year. Increased earnings included from this company were $1,206,031 more than in April, 1919. Eliminating these two items, the increase in the gross earnings was $3,318,414, or 23.3 per cent.

The consolidated statement of subsidiary earnings for the year showed that gross earnings were $18,362,673. Operating expenses, including taxes, were $14,044,166. This makes the net earnings $5,318,507, from which the rentals on the leased properties of $305,193 were subtracted, leaving a balance of $5,013,314. This balance, in addition to some earnings from subsidiary construction companies, gives a total of $5,131,766. After bond debentures and other interest of $2,953,893 and $1,971,696 had been paid, the Middle West Utilities Company's proportion of surplus carried to the aggregate surplus of subsidiary companies was $206,176.

FISCAL YEAR CHANGED

The fiscal year of the company has been changed to end Dec. 31. The next annual meeting of the stockholders will be held March, 1921, when a report will be submitted covering the eight months' period from May 1 to Dec. 31, 1920. The balance sheet shows an item of indebtedness of the Middle West Utilities Company due to the Middle West Securities Company of $3,100,000. A merger and consolidation of the two companies was authorized June 15, 1920. As a result this item of indebtedness has been eliminated.

Local Control Planned

Holders of Buffalo Bonds Outline Proposal for Distributing Assets of International Railway

The bondholders' protective committee which is in control of the International Railway, Buffalo, N. Y., has submitted to the bondholders a plan for the distribution of the assets of the railway by which they may acquire its stock and bonds, aggregating about $20,000,000. The plan would place the control of the railway in the hands of a group of Buffalo bankers.

DETAILED PLAN SENT OUT

The apportionment of the assets, however, is contingent on the bondholders paying what will be practically equivalent to an assessment of $1,600,000. This sum represents money borrowed by the protective committee and additional funds which would be necessary to meet obligations of the company.

Bondholders who refuse to pay their assessment or the amount necessary to participate in the distribution of the company's assets will of course be penalized. The Marine Trust Company, the Bank of Buffalo and the Manufacturers' and Traders' National Bank of Buffalo stand ready to participate in the underwriting.

The protective committee decided upon the plan at a meeting in New York on Aug. 6. The detailed plan has been sent to all bondholders. It will go into effect unless 30 per cent of the holders of the bonds object. The debts of the protective committee, which has been looking after the interests of the bondholders for more than a year, must be paid and the additional fund made available for financing the road.

The bondholders hold about $18,000,000 of the bonds of the International Traction Company, which owned all of the stock of the railway. After the traction company defaulted in its interest on the bonds, foreclosure proceedings were started and they acquired the stock which was security for the bonds. The bondholders have been represented by a protective committee of which Elliott C. McDougal, president of the Bank of Buffalo, is chairman. Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, is a member of the committee.

MITTEN MANAGEMENT TO CONTINUE

The Buffalo bankers who propose to take over the control of the railway will retain the Mitten interests to operate the traction system. Herbert G. Tulley, one of Mr. Mitten's aides, is president of the International. He will be retained under the reorganization plans.

A Return of 4.58 per Cent

Six-Year Statement of Income of Chicago Elevated Railways Made Public Recently

The consolidated income statement of the Chicago Elevated Railways for the years ended June 30, 1915, to June 30, 1920, inclusive, but with the last year based on eleven months actual results and an estimate for the month of June, 1920, without taking into account the increased wage scale which became effective on June 1, 1920, is shown in the accompanying table. The items in this table are as accepted by the Illinois Public Utilities Commission in the rate case which the elevated railways have before that body at the present time, items of $586,017 for replacement reserve, $137,501 for valuation expenses, and $50,000 income taxes having been set aside by the Public Service Commission.

CONSOLIDATED INCOME STATEMENT OF CHICAGO ELEVATED RAILWAYS

	1915	1916	1917	1918	1919	1920*
Revenues:						
Passenger	$8,369,337	$8,861,360	$9,764,134	$10,263,349	$11,050,930	$14,451,605
Other transportation	519,610	444,915	464,068	463,569	553,423	639,109
Non-operating	53,663	74,667	86,507	81,814	72,663	88,900
Totals	$8,942,610	$9,382,942	$10,314,709	$10,808,732	$11,677,016	$15,179,614
Operating expenses:						
Ways and structures	$212,038	$268,543	$301,945	$391,710	$735,816	$1,377,101
Equipment	398,142	528,828	584,620	663,753	849,138	1,203,629
Power	1,088,103	1,171,464	1,340,294	1,312,027	1,323,385	1,468,196
Conducting transportation	2,422,434	2,668,076	2,881,132	3,187,212	4,361,239	5,942,209
Traffic	6,908	20,651	27,855	26,225	33,874	27,978
General and miscellaneous	356,150	345,706	388,790	419,867	517,438	640,334
Totals	$4,485,775	$5,004,565	$5,524,636	$6,000,794	$7,820,890	$10,659,447
Taxes, car licenses, etc	$773,800	$789,662	$934,552	$1,012,094	$1,103,858	$915,088
Rentals	258,992	268,252	302,130	309,385	312,035	341,916
Totals	$5,518,567	$6,062,479	$6,761,318	$7,322,273	$9,237,783	$11,916,451
Available for depreciation and return on investment	$3,424,043	$3,320,463	$3,553,391	$3,486,459	$2,439,233	$3,263,163
Return on $70,943,020*	4.83%	4.68%	5.01%	4.91%	3.44%	4.60%

* Value fixed by ordinance of the City of Chicago, Aug. 14, 1918.

STATEMENT OF CHICAGO ELEVATED RAILWAYS FOR MAY

Gross earnings	$1,306,685
Total expenses	1,122,940
Balance for interest	$183,744
Fixed interest charges	206,103
Net deficit for May, 1920	$22,364
Payroll for May, 1920	700,264
Passengers carried in May, 1920	16,056,716
Since Aug. 1, 1918, wages on the elevated railroads have increased as follows:	
Aug. 1, 1918, increase per year	$1,566,537
Aug. 6, 1919, increase per year	2,650,739
June 1, 1920 (estimated), per year	1,756,512
Total increase	$5,973,788
Increase in cost of materials per year	793,918
Increase in power, taxes, rentals, etc	357,323
Total increase in expenses per year since Aug. 1, 1918	$7,125,029

The accompanying statement for the month of May, 1920, shows that there continues to be a deficit under the 8-cent cash fare, with two tickets for 15 cents. This deficit for June and July will presumably be increased, owing to the large increases in wages which became effective on June 1, whereas the increase in the rate of fare to 10 cents cash and four tickets for 35 cents did not go into effect on the lines of the elevated until Aug. 4.

If the return for the five-year period is averaged it will be found to be 4.58 per cent.

Large Decrease in Net Income

Long Island Railroad Operating Ratio Now 85 per Cent, an Increase of 10 per Cent in One Year

The thirty-eighth annual report of the Long Island Railroad for the year ended Dec. 31, 1919, shows that the company is approaching a crisis very rapidly. Operating expenses are increasing twice as fast as the operating revenues, the percentage change for the former being 23 per cent and for the latter only 9.7 per cent. This allowed a net income transferred to profit and loss under government operation of $2,500,000, a decrease of $1,700,000, or approximately 40 per cent, from the income of 1918. This decrease is due to the great increase in cost of operation and because no increase in fares has been allowed.

THE accrued compensation payable by the government to the company for the possession, use and control of the property of the Long Island Railroad, together with its other corporate income, enabled the company to pay its fixed charges, taxes and expenses and carry forward more than $682,000 to the credit of profit and loss. The latter account was charged with $115,773 to cover the yearly charge of $150,000 on the Atlantic Avenue leasehold estate, less other credits, so that the amount to the debit of profit and loss account was, as a result of such credits and charges, reduced to $566,303. The net income to the company under government guarantees in comparison with 1918 decreased about $90,000, or 11.8 per cent. This was due to the fact that the gross income increased only about two-thirds as much as deductions from the gross income.

$1,700,000 Decrease in Net

Glancing at the income statement of the federal operation, the net income decreased by $1,700,000, or more than 40 per cent, over 1918. This decrease may be traced to the increase in the operating ratio from 75.2 per cent in 1918 to 85.3 per cent in 1919. Operating revenues increased only 9.7 per cent, or about $2,100,000, while operating expenses increased 23 per cent over 1918, or nearly $4,000,000.

The extraordinary increase in passenger traffic of 16.5 per cent from 55,004,086 passengers carried in 1918 to 64,067,541 in 1919, with an increase in business through western terminals varying from 15 to 27 per cent, necessitated the acquisition of additional equipment. An arrangement was made for the purchase of 100 steel passenger cars at a cost of $2,088,000. These cars are under construction and should be delivered by the autumn of 1920.

The trend of operating statistics of the Long Island Railroad between the years 1881 to 1919 may be obtained from the accompanying chart. Gross revenues started from the low figure of $1,899,973 in 1881 and increased very gradually until 1916, when the increase was rapid, changing from $14,971,839 in 1916 to $24,381,974 in 1919. The operating expenses followed closely the curve of the revenues, starting at $1,674,135 and ending in 1919 with $21,689,979. From these two curves another may be drawn showing the variation in the operating ratio. The trend of this curve has been upward almost from the start. The lowest percentage ever reached was 58.1 per cent in 1887. At present the ratio has increased to 89 per cent, and there are prospects of its increasing still higher. One reason for the increase in operating ratio during the last eleven years is due to the fact that taxes are included in the operating expenses commencing with the year 1908. Expenses shown for 1918 and 1919 include taxes of the federal administration and the war taxes paid by the corporation, heretofore charged to "Railway Tax Accruals."

INCOME STATEMENT OF THE FEDERAL OPERATION OF THE LONG ISLAND RAILROAD

Year ended Dec. 31:	1919	1918	Percentage, Change
Passenger revenue	$15,607,723	$14,246,016	9.5
Freight revenue	6,280,427	5,713,725	9.9
Revenue from other railway operations	2,493,824	2,281,415	9.3
Total railway revenue	$24,381,974	$22,241,156	9.7
Maintenance of way and structures	3,163,138	2,894,843	9.3
Maintenance of equipment	4,334,035	3,173,826	36.6
Traffic	156,876	134,773	16.4
Conducting transportation—rail and water	12,167,012	9,867,339	23.2
Miscellaneous operations	175,543	175,884	— 0.2
General	591,929	500,528	18.3
Transportation for investment—Credit	1,684	8,122	—79.2
Total railway operating expenses	$20,586,849	$16,739,071	23.0
Net operating revenue	$3,795,125	$5,502,085	—31.0
Taxes assignable to railway operations	1,063,277	1,069,859	— 0.6
Uncollectable railway revenue	5,314	3,314	60.5
Expenses assignable to railway operations	$1,068,591	$1,073,173	— 0.4
Operating income	$2,726,534	$4,428,912	—38.6
Deductions from gross income:			
Net hire of equipment—Dr. Balance	$171,450	$277,962	—38.4
Net joint facility rents—Dr. Balance	133,384	259,859	—48.7
Net miscellaneous income—Credit	86,873	338,013	—74.1
Total deductions from gross income	$217,961	$199,808	9.1
Net income transferred to profit and loss	$2,508,573	$4,229,104	—40.8

INCOME STATEMENT—LONG ISLAND RAILROAD

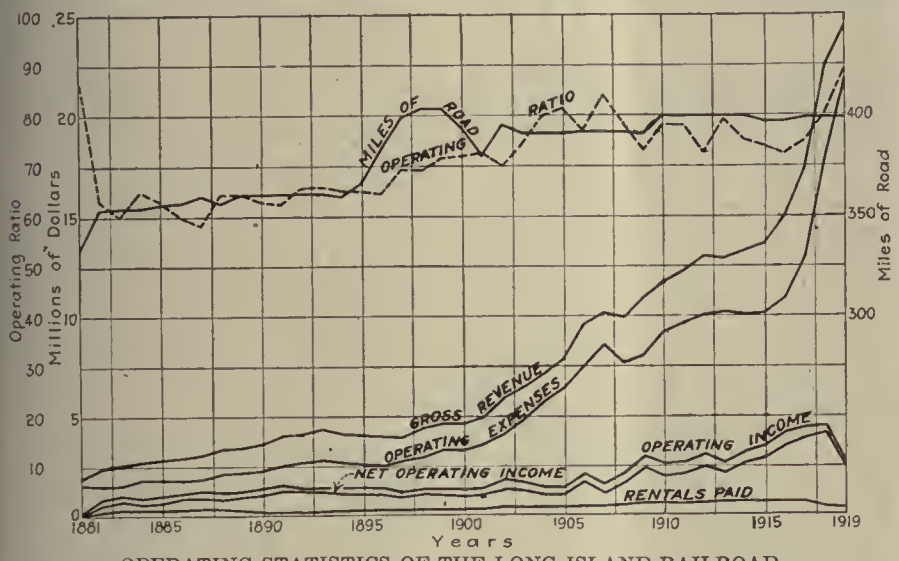
Year ended Dec. 31:	1919	1918	Percentage, Change
Compensation accrued under Federal control for possession, use and control of property of company	$3,221,949	$3,221,949	0.0
Other corporate income	719,276	562,299	27.9
Gross income	$3,941,225	$3,784,248	4.2
Deductions from gross income	3,258,719	3,010,273	8.3
Net income	$682,506	$773,975	—11.8
Disposition of net income	430	430	0.0
Balance transferred to profit and loss	$682,076	$773,545	—11.8
Amount to debit of profit and loss, at beginning of year	6,543,179	6,378,661	2.6
Sundry net debits during the year	115,773	938,063	—87.6
Amount to debit of profit and loss at end of year	$5,976,876	$6,543,179	— 8.7

STATISTICAL INFORMATION—LONG ISLAND RAILROAD

Year ended Dec. 31:	1919	1918	Percentage Change
Miles of single track	398.38	398.38	0.0
Train-miles:			
In passenger service	6,062,254	5,909,033	2.6
By freight service	433,074	481,077	—10.0
Total revenue train mileage	6,495,328	6,390,110	1.7
Car-miles:			
Passenger service	32,414,371	30,415,678	6.6
Freight and other service	9,433,192	9,684,003	— 2.6
Total car-miles	41,847,563	40,099,681	4.4
Revenue passengers carried	64,067,541	55,004,086	16.5
Passenger revenue	$15,623,417	$14,254,641	9.6
Passenger revenue per cent of total operating revenue	64.08	64.09	— 0.01
Passenger revenue per mile of line	$39,217	$35,782	9.6
Average revenue per passenger (cents)	24.39	25.92	— 5.9
Average miles each passenger was carried	15.97	15.99	— 0.1
Average number of passengers per car-mile	31.56	29.00	8.8
Statistics per train-mile:			
Passenger train revenue (cents)	278.2	257.7	8.0
Passenger train expenses (cents)	263.5	224.0	17.6
Net passenger train revenue (cents)	14.7	33.7	—56.8
Number of passengers	10.6	9.3	14.0
Train-miles per revenue passenger	0.094	0.1075	—12.6
Statistics per car-mile:			
Operating revenue (cents)	58.30	55.60	4.9
Operating expenses (cents)	49.20	41.80	17.7
Net income (cents)	5.98	10.55	—43.3
Number of passengers carried	1.52	1.37	10.9
Car-miles per revenue passenger	0.654	0.728	—10.2
Statistics per mile of road:			
Operating revenue	$61,203	$55,829	9.6
Operating expenses	$54,294	$44,764	21.3
Net operating revenue	$6,909	$11,065	—37.6
Number of passengers carried	160,820	138,000	16.5
Operating ratio per cent	85.3	75.2	10.1

The operating income is the difference between the gross revenue and operating expense curves. The figures for 1918 and 1919 represent the operation by the United States Railroad Administration, except those under "Rentals Paid," which represent the rental obligations of the Long Island Railroad. The amount shown under "Net Operating Income" is the difference between the result of the federal operation and the rental obligations of the corporation.

About 398 miles of road are operated by the Long Island at present. This represents about 880 miles of single track. About 70 per cent of this mileage is third rail. If traffic conditions are taken into account, the percentage of track which is electrified is very high, as the number of passengers carried on the unelectrified track is negligible compared with those carried on track supplied with a third rail.



OPERATING STATISTICS OF THE LONG ISLAND RAILROAD

Graph of revenue, expenses, operating income and rentals from 1881 to 1919, inclusive

The Long Island Railroad has applied to the Public Service Commission for an increase in passenger rates. Involved in the decision is the fate of another 100 passenger cars, which the company is contemplating purchasing in order to handle the growing passenger traffic. The financial ability of the company to pay for the cars, which are estimated to cost at present prices about $30,000 each, depends upon its ability to earn the interest on the money which must be borrowed to purchase this rolling stock.

Safety Cars as Security

The Virginia Railway & Power Company, Richmond, Va., through Cassatt & Company, Philadelphia, offers $250,000 car trust 8 per cent gold certificates at 100 and interest under the Philadelphia plan. The Philadelphia Trust Company is trustee and the certificates are dated July 1, 1920. They are of $1,000 denomination and are due serially $50,000 each July 1, 1921 to 1925. The security is fifty one-man safety cars built by the J. G. Brill Company at a total cost of $325,700.

Renewal Fund for New Cars

Commission Orders Chicago Company to Use Idle Funds to Purchase New Rolling Stock

The Illinois Public Utilities Commission on July 31 issued a supplemental order in which it directed the Chicago Surface Lines to continue to deduct from the gross receipts 8 per cent for the current renewals and accruing depreciation, but to deposit this sum from month to month in a special equipment fund instead of the renewal and depreciation fund as specified by the 1907 franchise, and to expend this sum, less actual expenditures for current renewals, in the purchase of additional equipment. Of the sum deposited in the equipment fund 60 per cent is to be deposited in the name of the Chicago Railways and 40 per cent in the name of the Chicago City Railway. From this special fund each of the companies is to pay its current renewals and expend the balance for the purchase of additional equipment.

The amount expended for such additional equipment is not to be made a charge against the capital investment of the companies, either in the amount upon which the commission will allow a fair rate of return or in the amount upon which computation is made under the city ordinances as the basis for fixing the compensation of the city of Chicago for the use of its streets, until the amounts thus expended have been repaid to the renewal and depreciation fund.

In an order dated Aug. 8, 1919, the commission said that the provision of the city ordinances for a reserve fund equal to 8 per cent of the gross receipts, for taking care of renewals and depreciation, was made on the basis of a 5-cent fare, and that in setting aside this money the company should not set aside more than 8 per cent of the amount of the gross receipts computed on the basis of a 5-cent fare instead of the higher rate of fare later authorized. In view of this opinion and the fact that the companies have been unable to comply with the order of the commission to purchase new equipment, by reason of financial difficulties and economic and financial conditions beyond their control, the commission sets forth the reason for its decision in the following words:

> It is the judgment of the commission that the public interests can best be served by requiring the active employment in the public service of the amount allowed by it for current renewals and accruing depreciation, and that this will be accomplished by ordering the investment of the amount thus allowed (less expenditures for current renewals) in necessary additional equipment, rather than by permitting such amounts to be deposited in an idle fund which draws only 3 per cent interest. The rights and interests of all parties can be protected by providing that the cost of additional equipment purchased under this order shall not be added to the petitioners' investment, or to the so-called capital account or purchase price provided in the city ordinances, unless and until they deposit in such renewal and depreciation funds the amounts which may be expended under this order for additional equipment.

To date more than $10,000,000 has been accumulated and is on deposit in the renewal and depreciation fund and is available for making renewals or replacements of principal parts upon certificates of the Board of Supervising Engineers. The 8 per cent allowance will amount to about $240,000 a month, of which $90,000 to $120,000 will be required for current renewals, leaving more than $120,000 a month available for new car purchases.

Under the duties imposed upon it by the Legislature the commission is required to determine the accruing depreciation, and under earlier order the sum was fixed at 8 per cent of the gross earnings, estimated on the basis of a 5-cent fare. Later the commission acknowledged that there was much force to the contention that this amount was entirely inadequate if provision is made for taking care of depreciation on the basis of labor and material costs at the time the depreciation is accruing.

B. & L. E. Bids Advertised

Bids are being advertised for the sale of the property of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., between the Buffalo city line and the New York State line except such parts of the line as were excluded by the provisions of the recent order of the Supreme Court of Erie county, referred to in the issue of July 17, page 147. The action for the foreclosure of the company's first and refunding mortgage is brought by the New York Trust Company, New York City. The property includes all the belongings of the company.

All bids must be delivered or mailed to George Bullock, receiver for the railway, at his office in Erie, Pa., before midnight of Sept. 15. Tenders must be accompanied by cash or a certified check to the amount of 5 per cent of the bid. The acceptance or rejection of the bids is subject to the approval of the court. A complete inventory of the property is on file in the office of the receiver at 61 Broadway, New York, N. Y., and his attorney, Daniel J. Kenefick, 1330 Marine Trust Building, Buffalo.

Boston Elevated Receipts Cover Costs

The expectations of the board of trustees of the Boston (Mass.) Elevated Railway have been fulfilled, according to a statement made by the bureau of audit of the company, as a result of the 10-cent fare established on the system a year ago. For the year ended June 30, 1920, there was a balance on the profit side of $17,079. This statement covers the second full year of public control. On July 10, 1919, the present 10-cent fare was inaugurated, but owing to the strike and other unfavorable conditions large deficits were sustained during the months of August and September of last year.

Commencing with the month of October, 1919, the operations of the road showed an actual profit each month over and above the cost of operation as defined by the act of the Legislature, until February, 1920, when abnormal snow expenses were encountered.

The month of February of this year showed an actual loss of $372,263. It is conservatively estimated that the snow expense of the company for the year just closed, taking into consideration the direct charges for removing snow, resulting loss of revenue, damage to equipment, etc., was at least $1,000,000.

The month of June, this year, showed a small loss due principally to a further increase in wages granted by the recent arbitration and to large expenditures for track work.

Month	Loss	Profit
1919		
July	$599,199	
August	227,029	
September	102,466	
October		$168,097
November		230,770
December		343,333
1920		
January		78,928
February	372,263	
March		91,076
April		150,190
May		98,584
June	5,776	
Invoice and other adjustments and profit and loss daily item		162,835
	$1,306,734	$1,323,814
Balance		$17,080

Foreclosure Sale Postponed

Holders of the first mortgage 5 per cent bonds of the Northampton (Pa.) Traction Company are again being urged to deposit their holdings. These bonds are due on Jan. 1, 1933. On Nov. 6, 1919, a bill of complaint was filed by the Northampton Trust Company, trustee for the bonds, against the company asking for the appointment of a receiver. Accordingly, Chester Snyder, Easton, Pa., was named to take charge of the property. A majority of the bonds has been deposited either with the Pennsylvania Company for Insurances on Lives and Granting Annuities or with the Northampton Trust Company. Foreclosure proceedings under the first mortgage were instituted and June 29, 1920, was set as the date for the sale of the property, but the sale was postponed.

Financial News Notes

New Chairman of Executive Committee. — Harrison Williams has been elected chairman of the executive committee of the board of the North American Company, New York, N. Y.

Receiver for Caldwell Traction Company.—C. D. Purkiser has been appointed receiver of the Caldwell (Idaho) Traction Company. Mr. Purkiser was formerly assistant general manager of the company.

Abandonment Authorized.—The Corporation Commission of Oklahoma under date of July 14 has permitted the Bartlesville Interurban Railway to abandon service of part of its line and also to remove poles, wires and tracks.

Colorado Line Abandoned. — The Durango Railway & Realty Company, Durango, Col., has ceased operation and will be dismantled. The city of Durango refused to take over the line for municipal operation. The road is 2¼ miles long.

Sells $10,000,000 of Gold Notes.—It is announced that the Pacific Gas & Electric Company, Sacramento, Cal., has entirely disposed of an issue of $10,000,000 of five-year 7 per cent convertible gold notes. More than $7,000,000 of the issue was taken in California.

Extra Dividend Declared.—The board of directors of the J. G. White Engineering Corporation, New York, N. Y., bas declared an extra dividend of 6 per cent in addition to the regular quarterly dividend of 1½ per cent on the common stock and the regular quarterly dividend of 1¾ per cent on the preferred stock, all payable Sept. 1 to stock of record Aug. 16.

Summer Resort Road Suspends.—The Point Pleasant (N. J.) Traction Company, which heretofore has operated 3.72 miles of line in summer at Point Pleasant, did not place the road in service this year. The company has failed for several years to earn its operating expenses and there were no funds available for carrying out improvements necessary to make the operation of the road safe.

Would Issue More Bonds. — Bond issues have been asked for in petitions filed with the Illinois Public Utilities Commission as follows: Decatur Railway & Light Company, Decatur, $354,000; Danville Street Railway & Light Company, Danville, $88,000; Urbana and Champaign Railway, Gas & Electric Company, Champaign, $88,000; and Urbana Light, Heat & Power Company, Urbana, $6,000.

Appraisal for Des Moines Lines.—As a preliminary to a settlement of the fare difficulties of the Des Moines (Iowa) City Railway the City Council of Des Moines has appointed three appraisers to determine the amount spent by the company for additions since 1915. A service-at-cost agreement was recently recommended as offering the best solution of the traction problems of the city.

United Railways Employs Power Experts.—The receiver for the United Railways, St. Louis, Mo., has employed two experts from Byllesby & Company, Chicago, to assemble data for his guidance in remaking the contract of the railway with the Union Electric Light & Power Company for steam-generated power at its expiration on Jan. 1, 1921, and also to devise a more perfect accounting system for the department of supplies and maintenance.

Towns May Purchase Line.—A committee representing Exeter, Hampton and other towns served by the Exeter, Hampton & Amesbury Street Railway, Exeter, N. H., is reported to be negotiating through the State Public Service Commission with a view to the purchase of the company's property by the municipalities. The railway some time ago announced its intention to discontinue operation.

Receiver Sells Cape Cod Line.—The property of the Plymouth & Sandwich Street Railway has been sold at a receiver's sale to Louis Sovensky, Combridge, for $55,200. This sale included all the real estate and personal property of the road in Plymouth and Sagamore. The road covered 17.8 miles. The first 6 miles was constructed in 1899 and 1901 and in 1914 the Sagamore end was put in. In 1916 and 1917 9.25 miles was built. Operation of the entire road was begun on July 28, 1917. Operation ceased on April 1, 1918. There was much litigation between contractors and the road. It is thought that most of the trackage will be pulled up and sold for junk. Many people believe that a portion of the road, from Hotel Pilgrim to Fresh Pond, could be made profitable, and are ready to make an attempt to purchase this end of the line.

Mortgage for $15,000,000 Filed.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has recently filed for record a general mortgage to the First Trust & Savings Bank, Chicago, and M. Traylor, Chicago, as trustee, to secure an issue of $15,000,000 of gold bonds dated May 1, 1920. The bonds will mature on May 1, 1950, but are subject to prior redemption. The issue was created for refunding purposes. Not to exceed $6,000,000 of the bonds may be issued from time to time and certified for refunding, redeeming or paying before maturity $6,000,000 of first mortgage sinking fund 5 per cent gold bonds of the company, issued on Jan. 1, 1910, of which there are $5,775,000 outstanding. Not to exceed $8,000,000 of the bonds will be used from time to time as the board may direct to care for extensions, improvements, additions, etc.

Traffic and Transportation

Councilmen After Jitneys

Guardians of Seattle Municipal Railway Insist that Unfair Competitors of Railway Shall Go.

An absolute ban on the operation of jitney buses in Seattle, Wash., is provided in an ordinance transmitted to the City Council by Corporation Counsel Walter F. Meier at the request of the City Councilmen. The ordinance, however, if passed by the City Council, could not become effective until approved by a vote of the people, Mr. Meier states.

Referendum Asked on Buses

The initiative petition presented by the jitney interests, calling upon the Council to submit to popular vote an ordinance in substitution of the present drastic regulations, is now in the hands of the Council. It contains the names of sufficient qualified voters to require an election on the subject at the next municipal election in March, 1921. According to Mr. Meier, any measures which the Council may pass before that election dealing with the elimination of the jitney must also be submitted to popular vote, as alternative propositions to the initiative ordinance, and cannot become laws upon being passed by the Council only.

The only hope of cutting off jitney competition at once now rests with the regulatory ordinance now in litigation, on which the courts are expected to pass on Aug. 20. The clause in the city charter which ties the Council's hands from enforcing a prohibitory ordinance without a vote of the people, according to Mr. Meier, is as follows:

> In case the City Council shall after rejection of the initiative measure have passed a different measure dealing with the same subject it shall be submitted at the same election with the initiative measure, and the vote of the qualified electors also taken for and against the same.

The ordinance introduced by Counsel Meier, after stating that the bill is based on the power of the city, provides as follows:

> It shall be unlawful to engage in or carry on the business of transporting passengers for, by, or in a jitney bus or to charge, demand, accept, or receive any fare, cash, ticket or other valuable thing in consideration of carrying or transporting any passenger by jitney bus within the limits of the city of Seattle.

Committee Defers Action

The public utilities committee of the City Council has laid over consideration of the ordinance for a period of two weeks.

In the meantime the outcome of the present regulations to come before the court on Aug. 20 is being eagerly awaited. In attempting to have vacated the temporary injunction under which the jitneys are now operating the city ran into an obstacle in the form of a writ of prohibition obtained by the jitney interests forbidding any judge of the Superior Court of King County from sitting to hear the city's motion to vacate the injunction until Aug. 20.

On that date the city is required to appear in the State Supreme Court at Olympia to show cause why the Superior Court should not be restrained from granting the motion to vacate the temporary injunction. It will be necessary for this writ of prohibition to be dissolved before the city can be heard on its motion to vacate the injunction.

If the city wins in Olympia on Aug. 20, and then wins out in the motion to vacate the injunction, the case will be dismissed from court and city officials would be free to enforce the existing regulations. If, however, the city loses the motion to vacate the injunction the case will be heard on its merits on Sept. 20.

Then if the jitney interests should win again a permanent injunction would be issued restraining the city from ever enforcing the regulations. If this permanent injunction is denied the jitney interests may appeal to the Supreme Court, and the temporary injunction would restrain the city from enforcing the regulations until the appeal is heard in Olympia some time next May. As the situation stands now, unless the city has the temporary injunction vacated, jitneys will be permitted to operate for at least another year.

Rochester Commissioner Takes Office

The new order of things in Rochester, N. Y., with regard to electric railway administration went into effect on Aug. 1. The 7-cent fare fixed in the cost-of-service contract will not become effective, however, until it is approved by the Public Service Commission for the Second District. It is expected that the new rate of fare will shortly be approved and in operation not later than Aug. 15.

Charles R. Barnes, the newly appointed commissioner of railways under the service-at-cost agreement, outlined his policy and immediate plans in a statement to a representative of the ELECTRIC RAILWAY JOURNAL. The features of the statement are the following:

1. Orders will be issued requiring the company to put into effect new schedules to increase the service on all lines, especially during the rush hours.
2. Relief from the present heavy congestion on Rochester's principal thoroughfares by ordering a new routing of the cars as soon as the increased fare is granted.
3. Reconstruction of a large amount of track and special work in the city for proper service.

Must Have 10 Cents

Kansas City Railways Applies to Commission for Immediate Increase—Rate Would Be Adjustable

The Kansas City (Mo.) Railways has filed an application with the Missouri Public Service Commission for an adjustable schedule of rates computed on the basis of the fluctuations in the price of fuel and labor, to become effective Aug. 20, the date of expiration of the present 8-cent fare. The effect of a favorable decision by the commission would be to raise the car fare immediately to a 10-cent cash fare with six tickets for 50 cents, or a ticket fare of 8⅓ cents.

Cost of Service Mounting

The present schedule of an 8-cent cash fare, two checks for 15 cents and five tickets for 35 cents, which has been in effect since Dec. 14, 1919, leaves an approximate deficit of $1,000,000 from operation during the calendar year ending Aug. 20, 1920. The fare is now averaging 7.42 cents a passenger and the approximate cost of furnishing service is 8.6 cents a person.

Wage increases Oct. 1, 1919, and June 1, 1920, have added $1,104,000 to the annual expenses of the company. Increased coal costs of $1 a ton, 60 cents of this increase being due to recent railroad freight hike and 40 cents due to the rise in the price at the mine, have increased the yearly expenditures $425,000. Based on the present price, the company's coal bill is now $350,000 more than in August, 1919.

Expenses Increase $2,000,000

Summing up these increases a total expenditure of more than $2,000,000 will be added to the company's expenses for the year. The company is asking for the 10-cent fare as one adequate to maintain the high standard of service which is being rendered, adequate wages to its employees and interest on the investment of stockholders.

The fare rate applied for is based on the present price of coal, about $4.43 a ton, and the average wage of trainmen of 53 cents an hour, which is now in effect. In case coal went to $4.93 and labor advanced as high as 58 cents an hour the 10-cent cash fare would still obtain, though only eleven tickets would be sold for $1. The present rate is figured on the basis of $3.43 as the cost for coal and 43 cents an hour for labor.

Jitneys Prove Burdensome

The company estimates that jitneys cost the street car riders of Kansas City a penalty of 1 cent a ride, taking as a basis the fact that the jitneys are hauling 40,000 people a day and thereby taking away at least $3,000 in revenue from the railway. The Kansas City Railway serves about 345,000 patrons and it would cost each patron about 1 cent to support the jitney service for the 40,000 people who use it.

Safety Cars Probed

Illinois Commission Holds Hearings to Determine Applicability of One-Man Equipment to Chicago Lines

Several hearings for the purpose of determining the applicability of one-man safety cars to operation by the Chicago Surface Lines were recently held by the Illinois Public Utilities Commission. The hearings were ordered by the commission as a means of deciding whether any substantial improvement of street railway service in Chicago could be secured through the use of this type of equipment.

SUITED TO MANY LINES

R. F. Kelker, Jr., city transportation supervisor, appeared before the commission and testified that he would not be prepared to commit himself on the advisability of bringing one-man cars into the Loop district until he had given the matter further serious consideration. He said, however, that there are numerous lines in Chicago where three one-man cars could be operated in place of two double-truck cars with resulting improvement both in service and in operating cost.

He said that the cost of operating the safety car in Kansas City, where he had recently made an investigation, was about $2,000 a year less than for the double-truck type of car. His observations as to the results obtained in Kansas City were that the safety car worked very well except at heavy transfer points where many persons wish to board and leave the car at the same time. Under this condition he thought the one-man type was too slow in loading and unloading to be used with a high degree of efficiency. On lines where there was little congestion the "safeties" would work admirably.

In his testimony Mr. Kelker also referred to the loading platforms which have been installed in Kansas City at various points. He said that despite the fact that in some cases there is a space only 9 ft. wide for vehicles between the platform and the curb, the platforms expedite traffic and reduce accidents. Prospective passengers can wait for cars without danger of being run down by automobiles and vehicles can proceed at the sound of the traffic whistle without waiting for street cars to finish loading and get under way as they do at present.

RECOMMENDS LOADING PLATFORMS

The cars are loaded much more quickly and get out of the congested districts much sooner. He said that he was thoroughly convinced that the installation of such platforms in Chicago, with a collector there to take the fares before cars are boarded, would do much to speed up downtown traffic, particularly in rush hours.

The chief engineer of the Illinois commission also submitted a report at one of the hearings, but inasmuch as this had been hurriedly prepared he drew no conclusions. However, he stated that while there might be some outlying lines in Chicago where safety cars could be used, their application to main lines was of doubtful value. The commission has issued no order as the result of the hearing.

More "Safeties" for Los Angeles

One-man car service began in the business district of Los Angeles, Cal., on Aug. 1. Twelve cars were placed in service as against nine of the older type which were replaced. The seating capacity of the safety cars is just the same as that of the cars formerly furnished, so that a marked improvement was afforded. A one-minute faster headway was permitted where the "safeties" are used through use of the three additional cars.

Use of the safety cars was introduced to the public by numerous newspaper articles furnished by the publicity department of the Los Angeles Railway and by small folders placed on the cars before the change was made. Cards hung in the cars announced that an important change in service was to be made and that the folders contained the details.

The "safeties" are equipped with name plates introducing the operators to car riders. The feature of name plates was adopted by the operators when they assembled for final instruction. The vote in favor was practically unanimous and so each safety car will announce: "This car is operated by William F. Smith," or whatever the carman's name may be. It is the theory of executives of the company that the average car rider who meets the same operator each day likes to be able to address him by name.

Suburban Line Increase Approved

The Public Service Commission for the Second District of New York by order issued July 6 authorized the Syracuse & Suburban Railroad to charge for the balance of the year 3.6 cents a mile for cash fares, 3.1 cents for ticket fares, 2.4 cents for mileage book rates, with minimum fare of 7 cents for each class, and 1.8 cents for commutation rates.

The order further provides that after Jan. 1, 1921, fares shall be at the rate of 3.5 cents a mile for cash fares, 3 cents for ticket fares, 2.3 cents for mileage book rate, with a minimum fare of 7 cents for all classes, and 1.7 cents for commutation rates.

Application for the increased rates was due to a recently granted wage increase, retroactive to May 1, the company alleging that the increase could not be met from present revenues of the company. Village presidents of Manlius and Fayetteville testified at the hearing before Commissioner Frank Irvine that in their opinion the wages granted are reasonable and not higher than those prevailing generally in those villages. The new wage scale was reached in settlement of a strike, the conductors and motormen receiving from 52 to 56 cents an hour. Their original demands were much higher.

Transportation News Notes

Fare Rise in Wichita Falls.—The City Commission of Wichita Falls, Tex., has passed an ordinance authorizing the Wichita Falls Traction Company to raise its fare from 5 cents to 6 cents. The company will make a 2-cent charge for each transfer.

Fare Increase Approved.—An increase in the rate of fare from 5 cents to 6 cents on the Sandusky, Ohio, line of the Lake Shore Electric Railway, Cleveland, has been approved by the Sandusky City Commission. Five tickets for 25 cents may be purchased under the new ordinance.

Appeals Fare Increase.—The City of Milwaukee has filed an appeal in the Dana County Circuit Court from the recent order of the Wisconsin Railroad Commission granting the Milwaukee Electric Railway & Light Company an increase in fares. The order of the commission became effective June 27 and fixed the fare at 7 cents, or eight tickets for 50 cents.

Ten Cents in Elgin.—The Illinois Public Utilities Commission on July 30 authorized the Aurora, Elgin & Chicago Railroad, Aurora, Ill., to raise its cash fare in Aurora and Elgin from 8 cents to 10 cents. The company was directed to sell six tickets for 50 cents. The increase was made necessary by the wage advances recently granted the company's employees.

Ten Cents on Rainier Line—Ten-cent cash and 6⅔-cent token fares went into effect on the lines of the Seattle & Rainier Valley Railway, Seattle, Wash., on July 20. Fifteen metal tokens are sold for $1. A charge of 2 cents is made for transfers to and from the cars of the Seattle Municipal Street Railway, on the token fare, no charge being made for transfers on the cash fare.

Seven Cents in Lima.—Beginning Sept. 1 the Ohio Electric Railway, Springfield, Ohio, will be permitted to charge 7-cent fares on its lines in Lima, Ohio. It will sell nine tickets for 50 cents, with free transfers. The increase has been authorized by the Lima City Council. The company asked for an 8-cent fare. The company will be asked to resume service on the Grand Avenue line, abandoned last winter.

Use of "Movie" in Louisville.—The Louisville (Ky.) Railway is using a moving picture screen advertising in every moving picture house in Louisville to place before the public its position in regard to 5-cent fares and the need for an increase. Practically the same material which is appearing in its advertisements in the daily papers is being flashed on the moving-picture screens throughout the city.

Seven Cents on Evanston Lines.—The Evanston (Ill.) Railway was granted an increase in its rate of fare to 7 cents cash or five tickets for 30 cents by an order of the Illinois Public Utilities Commission, announced last week. The new rate supersedes the former straight 6-cent fare with no tickets, and became effective Aug. 7. The rate of fare was changed from 5 cents to 6 cents on May 1, 1920.

City-Owned Line Reduces Fare.—A 5-cent fare became effective Aug. 1, on the Tacoma (Wash.) Municipal Railway. An additional charge of 3 cents is made for a transfer to the lines of the Tacoma Railway & Power Company and the Pacific Traction Company. The fare has been 7 cents. Transfers from the privately owned lines will be accepted by the city under the new arrangements, the companies paying the city 2 cents on each transfer issued by them and accepted by the city on the municipal line.

Flat Fares in Connecticut.—Seven cents is now the basic fare on the lines of the Connecticut Company, New Haven, Conn. The order of the State Public Utilities Commission abrogating the zone system of fare collection and setting up in its place a flat rate of 7 cents, took effect on Aug. 8. Under the new regime the initial fare of 7 cents permits a passenger to travel to any point within the traffic centers of cities and two miles from the traffic centers of towns, with a cost of approximately 3 cents a mile for distances traveled thereafter. Transfers are free.

Seven Cents in Charleston.—Fares on the lines of the Charleston Interurban Railroad, Charleston, W. Va., were raised from 6 to 7 cents by a recent order of the State Public Service Commission. The order provides that four tickets may be bought for 25 cents, or ten tickets for 60 cents. The commission based its order upon the net earnings of the company for the four-month period ended June 30. The net earnings, according to the company's report, after operating expenses and taxes had been deducted, amounted to $8,313. The rate was increased from 5 to 6 cents on Feb. 25 last.

Fare Rise Opposed.—An ordinance giving the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, the right to put in effect a flat 10-cent fare for four months on its lines in Findlay, is meeting with serious opposition from business interests of that city. The measure, prepared by the company's attorneys, gives the railway the alternative of discontinuing city service at the end of the 10-cent fare period. The company's representatives told the City Council that the 10-cent fare would not solve its problems as decreased patronage would result with higher fare.

Audit Justifies Fare Rise.—A 7-cent fare is required by the Oklahoma Railway, Oklahoma City, Okla., if the company is to continue to operate, according to the report of auditors appointed by the City Commission to examine the company's books. The railway recently applied to the municipal authorities for an increase in fare from 5 cents to 7 cents. The audit showed a valuation of $3,400,000, and on this valuation it was shown that a 7-cent fare would barely take care of wage increases already promised by the company and provide an equitable return to the company.

Seeks Seven Cents in Victoria.—A. T. Goward, local manager of the British Columbia Electric Railway at Victoria, B. C., has formally notified the City Council by letter that his company will make application to the Board of Railway Commissioners for a 7-cent fare on the Victoria lines. Mr. Goward points out that when the company first applied for permission to charge a 6-cent fare it believed that such a charge would make it possible to operate the system on a satisfactory basis. Subsequent events, however, have proved that this could not be done, according to Mr. Goward, and an appeal to the Railway Board for a 7-cent fare appeared to be the only course left.

Eight Cents in East Chicago.—An 8-cent fare has been granted to the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., by the State Public Service Commission on its lines in East Chicago, without affecting the transfer of school children, the commission abolishing the previous zones and zone fares of the company. The Indiana Railways & Light Company, Kokomo, has been granted a straight fare of 3 cents per mile on passenger service, effective on one day's notice. The Indiana Union Traction Company of Anderson has been granted an increase on its rates on the transportation of crushed stone, sand and gravel in carloads between points on its lines to a graduated scale of 40 cents to 85 cents a ton, effective on one day's notice, until Jan. 11, 1921.

Ask More on Interstate Lines.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has filed an application with the Missouri Public Service Commission asking an increase in passenger and freight rates. The company sets forth that it transports freight and passengers between points in Missouri and other states and as a common carrier is subject to the transportation act of 1920, and should operate on the same basis as the steam lines. The date of the hearing has not been set. The Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kans., has filed a similar application with the Kansas Public Utilities Commission for freight and passenger rate increases. The Interstate Commerce Commission has granted the petitioned increase on rates to the Kansas City, Kaw Valley & Western Railway and the company is publishing its tariffs. The new rates will go into effect Aug. 26.

Seven Cents Asked in Ft. Wayne.—Paul Haynes, representing the Indiana Service Corporation, has just concluded a hearing in Fort Wayne, Ind., on the petition of the Indiana Service Corporation, for a 7-cent fare in that city. The company throughout pointed out that it based its petition for increased fare on the former or pre-war valuation and not the present valuation of its property. Robert L. Feustel, president of the company, said that with an increase in fare it would be able to grant its men an increase and to keep its equipment in much better condition than before. At the present time the trainmen are getting 40 to 45 cents an hour. Mr. Feustel explained that if the 7-cent fare were granted the company would issue four tokens for 25 cents. City officials and the City Council are against the proposed increase. An audit of the company's books showed that in January of this year 1,528,000 passengers were carried, while in April with the same car mileage only 1,395,000 were carried.

Sliding Scale for Syracuse.—Adoption of a service-at-cost plan for the Syracuse (N. Y.) lines of the New York State Railways will be recommended in the report of a citizens' committee appointed some time ago to inquire into transportation conditions in that city. A commissioner of transportation, under the plan to be recommended by the investigating committee, will be named to supervise electric railway affairs in Syracuse. The original fare probably will be 7 cents. The proposed agreement follows in many details the agreement which the city of Rochester has accepted. The study by the committee revealed the fact that the only hope the people of the city have of enjoying efficient, prompt railway service was by the adoption of some agreement that would give the local lines of the New York State Railways a financial return commensurate with the investment in Syracuse. Ford, Bacon & Davis, the engineers who were employed to investigate the whole subject of local transportation, have practically completed their survey.

Wants Track Payments Cancelled.—The City Council of Tacoma, Wash., has protested to the United States Shipping Board against paying any part of the claim held against the Tacoma Municipal Railway for double-tracking the line during the war period. Representatives of the Shipping Board recently came to a tentative agreement with the members of the Council that the city should pay to the board the sum of $42,000 and turn back ten cars purchased by the Emergency Fleet Corporation in settlement of the standing indebtedness. As a war measure the Council voted to double-track the line to accommodate shipyard workers. After the voters of the city turned down the proposition of putting added money into the lines the Council had to proceed without tax money. The Government therefore helped to finance the improvements and furnished ten cars, giving the city an option on their purchase. The city has already paid the Government $16,000 in interest on the account. The cars cost $74,000, with $35,000 added for new motors, making $109,000 for the cars.

Legal Notes

CALIFORNIA—*A Person Crossing Behind a Passing Train Must Use Powers of Observation.*

The general rule that one who attempts to cross a railroad track must reasonably use his own powers of observation to assure himself there is no danger from approaching trains applies to a person from whom a train approaching on a second track is hidden by a train which has just passed. [Griswold vs. Pacific Electric Railway, 187 Pacific Rep., 65.]

CALIFORNIA—*Time When Relationship of Passenger and Carrier Terminates.*

Where a street car passenger had alighted upon the street for the purpose of transferring to another car, but before she had reasonable opportunity of getting away was injured by the overhang of the car from which she had alighted when it turned on a curve, the relation of carrier and passenger had not terminated. [Boa vs. San Francisco-Oakland Terminal Railways., 187 Pacific Rep., 2.]

FEDERAL COURTS—*Requiring Repaving with Asphalt Instead of Macadam Not Unreasonable—Low Earnings Not Excuse for Failure to Repave.*

Where a street railway franchise imposed on the railroad the obligation of repaving a specified portion of the street when the street was to be repaved, it was not an inherently arbitrary or unreasonable requirement to provide that such portion of the street be paved, like the rest of the street, with asphalt upon a concrete foundation, instead of macadam, with which the street was originally paved. While the financial condition of a public service corporation is a fact properly to be considered, when the reasonableness of an order directing an unremunerative extension of facilities or forbidding their abandonment is determined, the mere fact that a street railway is not earning 6 per cent on the value of its property does not relieve it of the obligation voluntarily assumed by its franchise to keep a specified portion of the street in repair. [Milwaukee Electric Railway & Light Company vs. State of Wisconsin, 40 Supreme Court Rep., 307.]

ILLINOIS—*Benefits from Elevated Railroad Which May Be Considered Not Limited to Those Resulting from Operation in the Particular Block.*

In determining the damages to abutting property from an elevated railroad, the special benefits from increased traffic and travel facilities which may be considered are not limited to those resulting from the construction and operation of the road in the particular block in which the property is situated, and evidence of the passenger traffic at stations a few blocks from the property is admissible. [Geohegan, et al., vs. Union Elevated Railway, et al., 126 Northeastern Rep., 763.]

INDIANA—*Negligence of Parent Cannot Be Imputed to Infant Five Years of Age.*

The negligence of a mother who was struck at a railroad crossing by a car cannot be imputed to her infant daughter, only five years old, who accompanied her and was also injured. [Terre Haute I. & E. Traction Company vs. Stevenson, 126 Northeastern Rep., 34.]

MARYLAND—*Ordinary Care Required for Safety of Boy Permitted to Ride on Outside of Car.*

A conductor, who permitted a boy to jump on the outer side of the back platform of his car for the purpose of riding across a bridge, by holding on to the outside of the safety gate, was required to exercise ordinary care for the safety of the boy after he became aware of his dangerous situation, and when the car failed to stop on the other side of the bridge and started to increase its speed, the conductor should have stopped the car to let the boy off or have opened the safety gate and admitted him to the rear platform. [Carr, et al., vs. United Railways & Electric Co. of Baltimore, 108 Atlantic Rep., 872.]

NEW JERSEY—*Pedestrian, Who Cannot Cross Ahead of Car in Safety, Is Negligent Unless He Waits.*

The rule enunciated in the opinion for affirmance in Earle vs. Consolidated Traction Company, 64 N. J. Law, 573, 46 Atl. 613, viz., "The first to reach the crossing has the right to pass over first, but if it appears that the motorman does not intend to respect his right of priority and that the driver [or pedestrian] cannot, in the exercise of reasonable prudence, exercise his right, he is guilty of contributory negligence if he fails to wait or turn aside, if he can do so by the use of due care, and thus protect himself from injury," followed and approved. [Connolly vs. Public Service Railway, N. J., 109 Atlantic Rep., 507.]

NEW YORK—*Lighting Fire on Cold Day Deemed Incident to Employment—Section Hand Working in Gravel Pit Not Engaged in "Interstate Commerce."*

Where a laborer, shoveling gravel into wagons on a cold day, suffered injury to his eye from a flying spark while building a bonfire to warm himself and his fellow workers during the intervals between the loading of wagons, his act was fairly incidental to the work, so as to justify an award under the Workmen's Compensation Law for the injury. Where a section hand on a railroad primarily designed for intrastate carriage of passengers, and incidentally in interstate commerce, was hurt in a gravel pit, away from the railroad's premises, while loading gravel into wagons driven to a siding and dumped into a work train for carriage to points on the right-of-way requiring ballast, he was not engaged in "interstate commerce," within the federal law, and he was therefore within the protection of the state Workmen's Compensation Law. [Malandrino vs. Southern New York Power & Railway Corporation, 180 New York Supp., 735.]

NEW YORK—*Pedestrian Held Negligent in Failing to Heed Approaching Car Observed.*

A pedestrian, who, when she started to cross street railway tracks, observed an approaching car at a distance and in a position where there was manifest danger of colliding with it but paid no further attention to it, was chargeable with contributory negligence as a matter of law. [Salmirs vs. Union Railway of New York City, 181 New York Supp., 283.]

TENNESSEE—*Bond by Traction Company for Construction of Line Held Penal, Though Given to Municipality.*

Where a traction company, under a franchise to construct lines on particular streets, executed a bond for $200,000 to secure the municipality against loss, and also to procure the company's compliance with the regulation requiring stipulated expenditures within a fixed time, the bond must be treated as penal, notwithstanding the rule that the bond given to secure performance of public work for the benefit of a municipality will be treated as liquidated damages, because of the difficulty of ascertaining the damage. However, the city cannot recover damages from the company without proof of special injury. [City of Nashville vs. Nashville Traction Company, et al., 220 Southwestern Rep., 1087.]

WEST VIRGINIA—*Municipal Franchise Construed to Entitle City to Base Its Percentage on Gross Receipts Without Abatement for Lines Beyond Its Limits.*

A provision in a railway franchise provided for the payment of a certain percentage of the gross revenues from all of its lines operated wholly within the corporate limits and certain other specified lines which are partly within and partly without the corporate limits. Held, that this clause entitles the city to receive the percentage provided in the contract upon the entire gross receipts from such lines without any abatement therefrom because of that part of the specified lines which may lie without the corporate limits. [City of Parkersburg vs. Kanawha Traction & Electric Company, 102 Southeastern Rep., 116.]

Personal Mention

P. R. Taylor, office engineer of the power plant of the Kansas City (Mo.) Railways, has resigned to accept the position of city manager of Grand Haven, Mich.

E. E. Brownell has been engaged by the City Council of Akron, Ohio, to represent the city in the negotiations with the Northern Ohio Traction & Light Company looking to a settlement of the traction issues in Akron.

George I. Plummer, assistant general manager of the Dallas (Tex.) Railway, has returned to Dallas after an extended trip through the North, Middle West and South, where he studied transportation conditions in the principal cities.

Lewis Nixon, Public Service Commissioner for the First District of New York, sailed for Europe on the *Aquitania* on Aug 1. While abroad Mr. Nixon will study at first hand the operation of bus lines in London and other parts of England.

C. J. Sullivan, of Fairport, N. Y., has been appointed by Charles R. Barnes, commissioner of railways of Rochester, N. Y., accountant and auditor of the New York State Railways, Rochester lines. Mr. Sullivan has served for a number of years in different departments of public utility companies in various sections, acting in all capacities from master mechanic to general manager. For the past three years he has been the expert accountant for the capitalization department of the Public Service Commission for the Second District. While in that position he was assistant to Mr. Barnes in the investigation of the New York State Railways' finances.

Major Phillip Dawson has received the honor of knighthood at the hand of King George. Sir Phillip is a partner of the firm of Kincaid, Waller, Manville & Dawson, consulting engineers, London. He is also consulting electrical engineer of the London, Brighton & South Coast Railway. In the early days Dawson's "Electric Traction" was the standard book on electric railway engineering, and later his handbook was recognized as the authority on that subject. During the war Sir Phillip rendered valuable service as a member of the Disposal Board, Ministry of Munitions. He was also named a member of the commission appointed by the Belgian Government to investigate the future of the Belgian State Railways. He is now prominently associated with the scheme for the electrification of these railways. Sir Philip is a member of the Institute of Civil Engineers, the Royal Institute of Mechanical Engineers and the Institute of Electrical Engineers.

Railway Gets Editor

Mr. Clark Leaves Association Work to Join Public Service Railway—Authority on Fares

Harlow C. Clark has resigned his official connection with the American Electric Railway Association to accept a position with the Public Service Railway, Newark, N. J. Mr. Clark will enter at once on his new duties with the publicity department of the company. For this work he is admirably fitted by reason of his keen understanding of the problems of the industry, gained during his long service as editor of *Aera*, the Association's monthly magazine.

Mr. Clark is a native of Syracuse,



H. C. CLARK

New York. He was educated in the public schools and high school of that city and in Blackhall School, in Connecticut. His first work was in the steam railroad field, serving in the freight and transportation departments of the New York Central and the Lehigh Valley Railroads. In 1892 he returned to Syracuse and entered the employ of the Syracuse *News* as a reporter, subsequently serving as Sunday editor and city editor on the Syracuse *Herald* and *Journal*.

In 1903 Mr. Clark was drafted from newspaper work to become secretary to the Mayor of Syracuse. Two years later he became secretary of the Syracuse Chamber of Commerce and in 1907 was appointed Commissioner of Public Safety under Mayor Forbes. At the expiration of his term of office he returned to the Chamber of Commerce as secretary. In 1911 he joined the staff of the Syracuse *Journal* as one of its editors. In the following year he was with the firm of Allen & Peck, Inc., his work being in the public relations field. Mr. Clark was appointed editor of *Aera* in 1913.

Mr. Clark has written extensively upon public utility matters, being the author of "Service at Cost Plans," a book recently published dealing with modern electric railway franchises. He was one of the witnesses before the Federal Electric Railways Commission and the Public Utilities Committee of the Chamber of Commerce, investigating electric railway affairs and has achieved a reputation as an authority on the subject of electric railway fares and the relations of electric railways to the public.

Obituary

Albert O. Brown, traffic director of the Peoria (Ill.) Railway, died on Aug. 1 at his home in that city from heart disease. He was fifty-four years of age.

Luther E. Guy, claim agent of the Southern Public Utilities Company, Charlotte, N. C., and the Piedmont & Northern Railway, Greenville, died recently.

Charles McGinley, formerly superintendent and roadmaster of the Kansas City (Mo.) Railways, died recently. Mr. McGinley was born in Canada in 1838. He entered the employ of the Kansas City lines in 1880.

Russell A. Griffin, general sales manager of the National Pole Company, died on July 14 from pneumonia. Mr. Griffin was formerly connected with the American Telephone & Telegraph Company and later with the Western Electric Company.

Daniel L. Prendergast, head of the real estate department of the Boston (Mass.) Elevated Railway, died on July 28 at his summer home in Nantasket, Mass. Mr. Prendergast had been ill about two months. He was born in Boston in 1857.

Melvin O. Adams, president of the Shirley Street Railway, Winthrop, Mass., a subsidiary of the Boston, Revere Beach & Lynn Railroad, died in Boston, Mass., on Aug. 9. Mr. Adams was also president of the Boston, Revere Beach & Lynn, a steam road. He was seventy years old.

Stiles P. Jones, active in electric railway franchise considerations in Minneapolis, is dead. He had been executive secretary of the Minneapolis general franchise committee, secretary of the Voters' League, examiner for the War Labor Board in Washington and member of the National Public Utility League and of the National Municipal League.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Embargoes Hindering Deliveries to Electric Railways

Need of I. C. C. Removing Restrictions —Purchasing Agents Working Hard to Overcome Delays

A crying necessity of the hour from the purchasing agent's standpoint is the removal of embargo restrictions upon the shipment by rail of many kinds of supplies destined for traction service. Recently the purchasing agent of one of the largest electric railway systems in the country informed a representative of the ELECTRIC RAILWAY JOURNAL that the public interest is closely concerned with the inability of traction companies to obtain shipments from manufacturers on as free a basis as is available to the steam railroads. It was strongly urged that the Interstate Commerce Commission be appealed to on behalf of removing embargo restrictions which if continued can have but one outcome in many cases—the stoppage of construction and repair work and the ultimate withdrawal of service on many railway lines.

DELAYED SHIPMENTS SERIOUSLY AFFECT NEW CONSTRUCTION WORK

One company, for example, has been unable to obtain a shipment of twenty-five carloads of ties from Jacksonville, Fla., since the early part of the year, and another tie shipment aggregating 100,000 cannot be moved out of a locality in West Virginia under present embargo restrictions. If the Interstate Commerce Commission would authorize the same freedom of movement on such material destined to electric railways that it approves in the case of the steam roads the situation would be greatly improved. Both are public utilities, this purchasing agent affirmed, and unless the above shipments of ties are made in part soon, he pointed out, it will be necessary to lay off 1,000 men engaged in pushing important track construction for the benefit of improved public service. In the case of steel rails and heavy supplies for car service the situation is likewise urgent. Machine tools, when needed, and smaller supplies available by express shipments can be obtained fairly satisfactorily, if an operating company is prepared to pay the cost of the higher-speed transportation.

It would be difficult to estimate the excess cost of operating companies this year, resulting from express shipments made necessary by the congestion of freight service. One of the leading purchasing agents stated recently that whereas many industrial companies can afford to maintain tracers in the field to expedite deliveries the traction companies as a rule cannot spare the funds required to follow up material in person. Such difficulties react upon the service rendered the public sooner or later, but the car passenger has little or no conception of the efforts which are being made at present to overcome the freight congestion as it affects local traction systems. It is maintained that electric railways as public utilities ought not be forced to spend time and money seeking special permits on individual freight shipments of embargoed commodities, but that a blanket order should be issued which will once and for all result in the freer flow of supplies.

Utilities Get Extension of Coal Priority

Confliction Regarding the Right to Both Purchase Coal in the Open Market and Secure Assigned Cars

Extension of orders Nos. 7 and 9 for ninety days from June 21 was made on Wednesday by the Interstate Commerce Commission, thereby assuring electric railways and other utilities priority of coal car assignments for coal for current use until Sept. 19. Order No. 9, which granted priority to utilities, was entered on July 13 and was to last until Aug. 19.

Under that order utilities could secure coal cars for coal for current use but not for storage. Certain interpretations of the order, however, were necessary. The rule did not make it plain whether or not utilities could store coal by purchasing in the open market and at the same time secure assigned cars for current use. The Interstate Commerce Commission assured different state utility commissions that the utilities could secure all of the coal they wished in the open market. This naturally implied that utilities which did so buy in the open market in order to assure the public of continuous service would not be penalized by being refused assigned cars.

NO CAR ASSIGNMENTS TO UTILITIES WITH SURPLUS SUPPLIES

It has developed, however, in a dozen or more cases that the railroads have refused to assign cars to utilities with a surplus supply on hand. The stand taken by the railroads in each case was upheld by the Interstate Commerce Commission. These conflicting points of view of the I. C. C. have been brought to the commission's attention and a clarifying interpretation is expected.

The commission, it is known, has been urged from a number of separate sources to broaden its order pertaining to utility car assignments so as to permit the utilities to begin to secure coal for winter storage. It was known, however, that the commission was not in favor of such action and consequently it was not surprising to find no mention thereof in the continuing order of last Wednesday.

It has also been learned that in some cases mines have been able to secure enough coal cars for their output so as to be able to refuse to load cars assigned to utilities.

Generally speaking, however, utilities are everywhere taking advantage of the priority order and as a result securing more coal on contract. As a result coal is costing the utilities less. There are also indications that spot coal may cost less.

Attorney-General Palmer has been investigating the prices charged for spot coal and the reports to the Federal Trade Commission showing what it costs to mine coal. Within a few days from this writing he is expected to name a fair profit for spot coal. Coal companies making a greater profit will be subject to prosecution for profiteering under the Lever act.

Fare Rate Increases Catch Railways Asleep

Traction Companies Do Not Always Anticipate Changes in Fare Box Mechanisms

Manufacturers of registering fare boxes have been embarrassed at times by their inability to meet the demand of companies who have been granted an increase in fare. These demands made upon the manufacturer are at times unreasonable and prove to be a source of complaint which it seems is hardly justified.

It has frequently happened that railways have not anticipated a change in fare, which necessitates the use of multiple coins and thereby an additional coin plate in the fare-box mechanism, by making adequate preparation. When the fare increase is granted, to become effective in the near future, the company often comes back to the fare-box manufacturer with the proposition of

completely changing the fare-box coin-counting mechanism in an impossibly short period. The suddenness of such demands has made it physically impossible in many instances for the manufacturer to meet these requirements. It is believed that a little forehandedness in this respect will save traction companies from the possibility of not being able to install the new rate of fare as soon as it is authorized, and it certainly will make the problem of taking care of such customers a much more simple and businesslike one for the manufacturers. It is hardly fair to expect that a manufacturing plant shall be turned upside down and all regular work put aside and greatly delayed by the necessity of meeting the requirements in a fare-increase situation all in a minute.

Advantage of Metal Tokens for Multiple Coin Fares

Incidentally, this frequent changing of the fare rate would seem to emphasize the advantage of using metal tokens for multiple coin fares, for in that case a change in the rate of fare will usually not involve the necessity of altering the fare box. The change necessary when metal tokens are used is a very simple one, and a new supply of the tickets can be secured upon rather short notice. This is an advantage which is appreciated only at the time of a change in fare rates, but the continuing advantages of the metal token are well known.

Unusual Demand for Controller Parts

Production Has Not Caught Up with Heavy Orders for Repair Parts Damaged Last Winter

Sales of controller fingers and segments have gone forward this year faster than ever before, according to several of the large manufacturers of this material, until at present the demand is far above normal and proceeding regularly. This is in spite of the fact that sales are usually spasmodic and extremely light during the summer months. One of the large producers stated that his sales for the first six months of 1920 had been greater than for the whole previous year. The basis of this extraordinary condition may be traced back to last winter, when traction companies were harder hit by storms than for many years. As a result excessive demands were made upon manufacturers to replace broken-down equipment, one of the large items being controller parts. Production has not yet fully recovered from the incubus of that overload, consequently orders in some cases are still far ahead of available output.

Reports on factory stocks reveal very uneven conditions as some manufacturers are reduced to bare shelves while others have acquired fairly good stocks. Delivery quotations also vary widely, the extreme length of time running to eight weeks; but several producers quote from two to four weeks, with one even shipping principally from stock. Deliveries on small sized orders can be made more quickly than those in larger quantities. Difficulties in obtaining metal are experienced in many cases, not that there is any actual shortage of raw material, with copper in its present condition, but merely that transportation troubles have been seriously holding up needed supplies.

Several companies report a volume of production that is not only normal but increasing and which bids fair to catch up soon with the number of unfilled orders. Many of the buyers are old customers and practically no orders have been canceled. Spasmodic labor troubles are felt in this field, but the general situation is good, especially since the close of the strike of brass workers in New England, which is expected to make further supplies of unfinished material available for the production of goods.

Prices have remained steady, and manufacturers hope to maintain the present price level, although in some quarters further increases are looked for. The majority, however, seem to anticipate no fluctuation. Collections are said to average about two months.

Strong Market Ruling for High-Tension Insulators

No Stocks of Finished Products Reported, While Shipments Run from Six to Ten Months

Although the production of high-tension insulators is said to be up to normal capacity, or nearly so, demand has increased to such an extent that it now far outstrips available supply. Not only is a good volume of domestic orders reported but the call coming from foreign countries since the war has been steadily increasing and export orders are now an important factor in the business. South American countries, France, Italy, and the Scandinavian peninsula offer especially favorable markets for porcelain insulators, and replacements seem to be about an equal factor with new construction work in accounting for the demand.

Finished Goods Are Not Available

Manufacturers when questioned regarding stocks of finished goods throw up their hands in despair at the very suggestion of the existence of such a thing. Reports on the raw-material situation, however, are not so uniformly bad, for although this item is undoubtedly causing delay the use of personal tracers to locate shipments and careful attention to ordering supplies long ahead have guarded against an acute shortage. Little labor trouble has been experienced in this field, although in one or two quarters some shortage of skilled workmen is reported.

With the output of insulators unable to keep pace with demand delivery dates have been growing longer. Six months is about the very best figure quoted, and shipping dates run all the way up to ten months, depending upon the size and type. Medium-voltage sizes around 35,000 to 45,000 volts seem to be in the best shape as regards deliveries, while the highest voltage types are the worst off in that respect. Suspension insulators in several cases are reported a little easier than the pin type, and although in the former case the metal parts are a factor in production the metal is not holding up the program so much as porcelain. In spite of long deliveries an almost entire absence of cancellations is noted.

Prices at present are high, and opinions differ as to whether further increases may be expected. No price change is reported since the advances made a month and a half or more ago. Manufacturers in this line as a whole report their bills are being met fairly promptly and that little trouble is experienced with collections.

Foreign competition seems still to be a negligible quantity in affecting the American market for high-voltage insulators, as the industry abroad has not as yet sufficiently recovered from its period of war apathy.

Poor Impression Created by U. S. Made Street Cars

An unfortunate condition in respect to American trade propaganda exists on the street car lines of Buenos Aires. It happens that the oldest and most dilapidated trolley cars are of American make, of a type twenty years old. By comparison with the later models of British-built cars, thousands of the daily users of these cars, who have not seen more recent American designs, are led to believe that European mechanical equipment is superior to North American. The two street railway companies operating in Buenos Aires are the Compañia de Tranvias Anglo-Argentino, Ltd., and the Compañia La Croze.

Rolling Stock

The Kansas City Railways, Kansas City, Mo., advises that it purchased seventy safety cars the early part of this year.

Northern Ohio Traction & Light Company, Akron, Ohio, has just been granted authority by the Public Utilities Commission to purchase the twenty new interurban cars, fifty-six city cars and ten city trailers mentioned in the April 24 issue. Total cost of the cars will be $1,358,000. Officials of the company state that the price of cars on this one order has advanced $100,000 in four months.

Cheyenne (Wyo.) Electric Railway recently lost its carhouse, tools, repair parts and several cars in a fire which caused damage to the extent of $50,000. Included in the destroyed equipment were four new inclosed trailers without motors valued at $3,000 each, two motor

cars valued at $10,000 each, one car of an older type, and one hand-brake car.

Recent Incorporations

Richmond & Fairfield Railway, Richmond, Va.—The Richmond & Fairfield Railway has been incorporated. This is a successor company to the Richmond & Seven Pines Railway, which has recently been sold. The officers are Oliver J. Sands, president; Arthur E. Parrish, vice-president and treasurer; J. A. Baird, general manager.

Track and Roadway

Sacramento Northern Railroad, Sacramento, Cal.—With the approval of the City Commission the Sacramento Northern Railroad will remove its tracks on Nineteenth Street from I to K and will vacate its franchise on that track.

Northwestern Pacific Railroad, San Francisco, Cal. — The Northwestern Pacific Railroad has applied to the Railroad Commission for permission to construct an undergrade crossing across the highway near Tyrone, Sonoma County. The new crossing is to take the place of a grade crossing to be abandoned.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—The land recently acquired by the Washington, Baltimore & Annapolis Electric Railroad for its new terminal building will be cleared of buildings and tracks will be laid.

Kansas City (Mo.) Railways.—The Kansas City Railways are completing the rebuilding of 2.045 miles of track in the downtown district, representing an expenditure of $101,256.

Northern Texas Traction Company, Fort Worth, Tex.—The Northern Texas Traction Company has begun work on the machine shop to be erected at 1600-1610 East Front Street, Fort Worth. The building is of reinforced concrete. It will cost about $60,000.

El Paso (Tex.) Electric Railway.—As soon as the money is available the Fort Bliss line of the El Paso Electric Railway will be double-tracked. This contemplated improvement will cost about $200,000.

Knoxville Railway & Light Company, Knoxville, Tenn.—Extensive new track construction is being planned by the Knoxville Railway & Light Company. This plan includes new lines on Wall Avenue from Gay Street to Asylum Avenue and double-track lines on Asylum Avenue from Walnut to South Broadway.

Ohio Valley Electric Railway, Huntington, W. Va.—The Ohio Valley Electric Railway expects this summer to lay a double-track in Ashland, Ky., from Twenty-second Street to Twenty-ninth Street; also a new track in Huntington, W. Va., from Twenty-fourth Street to Guyandotte.

Ohio Valley Electric Company, Huntington, W. Va.—Following the announcement that the Ohio Valley Electric Railway will abandon its local freight station because its funds are insufficient to defray the expenses of rebuilding it T. F. Bailey, general manager of the Banks Supply Company, announced local jobbers were willing to purchase a sufficient quantity of bonds of the company to enable it to rebuild the station. The freight shed was damaged by fire recently and the fire marshal ordered it razed.

Power Houses, Shops and Buildings

Los Angeles (Cal.) Railway.—An attractive and serviceable waiting station especially suitable for a terminal point has been established by the Los Angeles Railway at Manchester and Vermont Avenue with shuttle car continuation.

Interborough Rapid Transit Company, New York, N. Y.—Bids for the completion of the passenger station, electric lighting and heating systems for the Livonia Avenue (Brooklyn) line of the Interborough Rapid Transit Company will be received at the company's office, 165 Broadway, New York City, until Aug. 23, at which time the proposals will be publicly opened and read.

Central Texas Electric Railway, Waco, Tex.—The Central Texas Electric Railway, which is building an interurban line from Waco to Temple, has purchased a grading machine with which the grading on the line between Waco and Robinson, a station 6 miles out of Waco, is being done.

Monongahela Valley Traction Company, Mannington, W. Va.—The new terminal building of the Monongahela Valley Traction Company at Mannington, W. Va., was opened on Aug. 1. It is a one-story building, modern in every respect, and has been built to care for the increased business in the oil town.

Cheyenne (Wyo.) Electric Railway.—A fire believed to have been of incendiary origin has destroyed the carhouses, cars, tools and repair parts of the Cheyenne Electric Railway. The damage amounts to about $50,000 and the matter of repairs has not yet been decided by the company.

Trade Notes

The Brown Instrument Company, Wayne and Windrim Street, Philadelphia, is making arrangements for an extension to its plant, to cost about $20,000.

The Republic Flow Meters Company, Chicago, announces removal from 565 Washington Boulevard to its new factory at 2240 Diversey Boulevard.

The Locke Insulator Manufacturing Company, Victor, N. Y., has been granted permits to erect two factory buildings, one 66 ft. x 59 ft. and the other 62 ft. x 141 ft., at Charles and Cromwell Streets, Baltimore, Md., to cost about $44,000.

Westinghouse Changes.—The Westinghouse Electric & Manufacturing Company announces that L. D. Canfield, assistant district service manager at the New York office; has been appointed district service manager to L. G. Richards, who has been transferred to East Pittsburgh. G. O. Noble has been appointed special representative.

The Metal & Thermit Corporation, New York, N. Y., has made arrangements to insure all employees who have served the company for at least six months. The amount of protection is graded according to the length of service. The company bears the entire expense of the insurance, which is in addition to any compensation which might be granted employees under the present State compensation laws.

A. H. Grayburn, for the past four years assistant to the vice-president of the Norma Company of America, Long Island City, N. Y., has been made assistant secretary and assistant treasurer of the company. Norman Bell has been appointed sales manager of the company. This appointment follows a connection over three years with the company as sales engineer.

Titan Steel Corporation, Newark N. J., recently organized under the laws of Maryland, has acquired the plant of the Hewitt Steel Corporation, also of Newark. The company proposes to utilize the plant, which was used during the war for the manufacture of shells, in building railroad equipment and also for making its specialties, which are railway car trucks and body bolsters. The company has secured the manufacturing rights in the Hewitt car trucks and journal boxes. Sufficient orders are reported on hand to insure capacity operation for some time to come.

New Advertising Literature

Air Separator.—The Griscom-Russell Company, 90 West Street, New York City, has issued bulletin No. 1111, covering its Stratton air separator.

Time-Saving Accessories.—In the latest issue of the "Esterline Graphic," published by the Esterline Company, Indianapolis, Ind., the subject of time-saving accessories for use with graphic meters is taken up.

Electrically Driven Tools. — The James Clark, Jr., Electric Company, Louisville, Ky., has issued catalog No. 28, covering the "Willey" electrically driven tools, generators and motors.

The Yale & Towne Manufacturing Company, Stamford, Conn., has issued Volume 5, No. 3 of its bulletin "Hoisting Hints," an issue specially devoted to machine shop work.

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itself—that is the time you need braking power that increases with the increasing load. Briefly, you need



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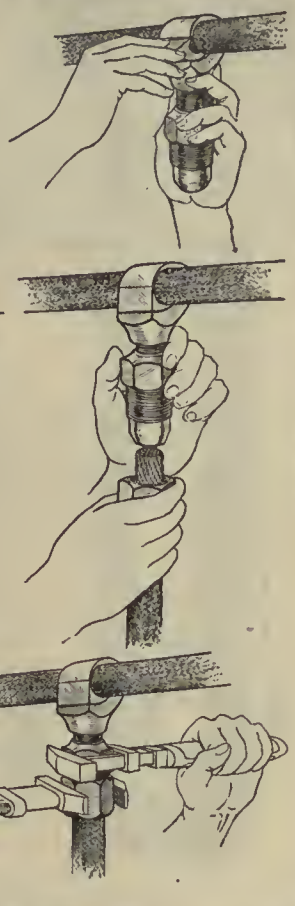
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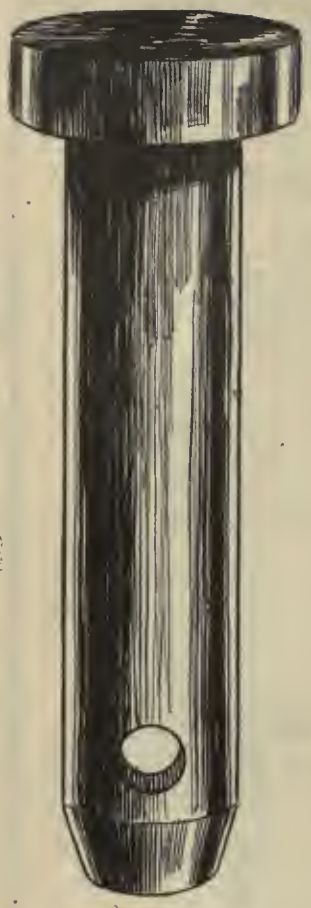
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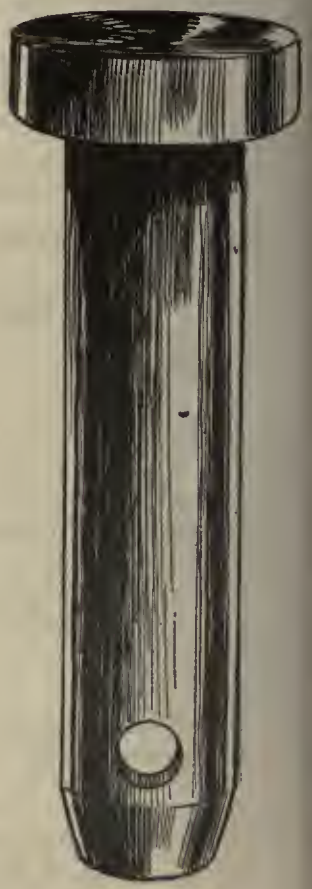
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Electric Railway Journal
Issue of May 1, 1920, Page 2.

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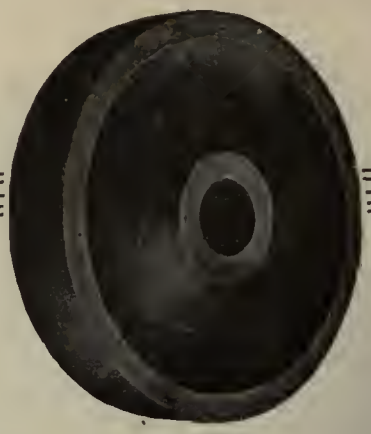
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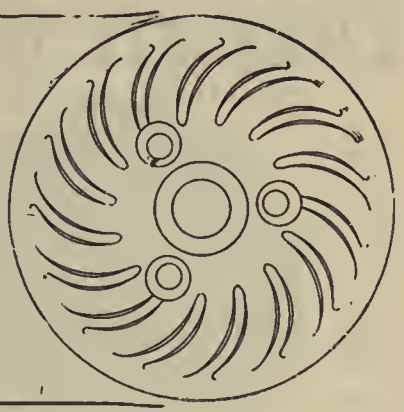
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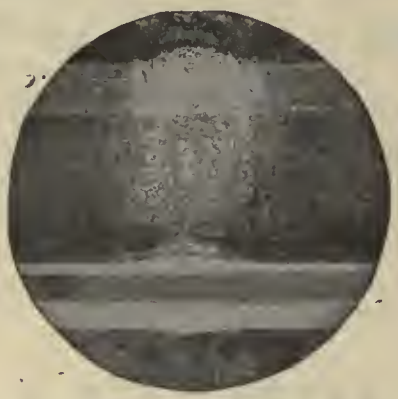
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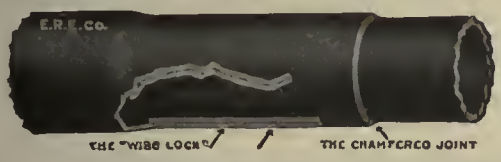
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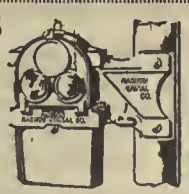
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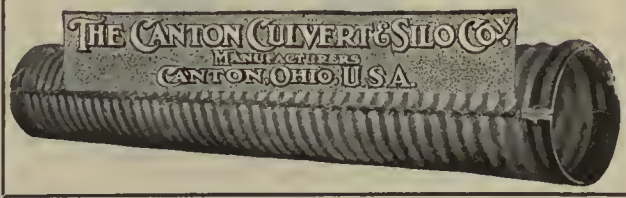


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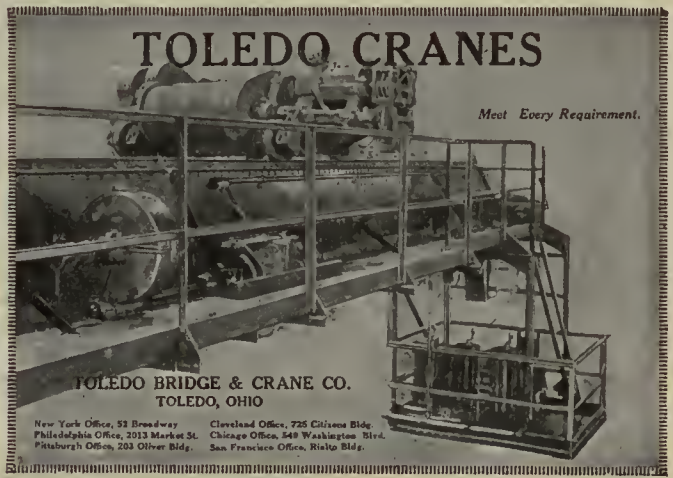
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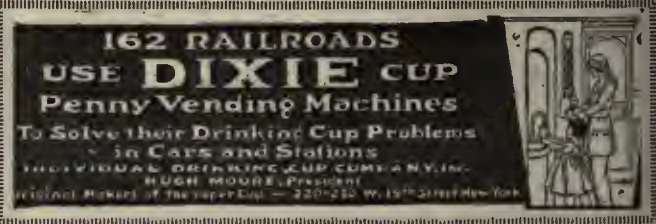
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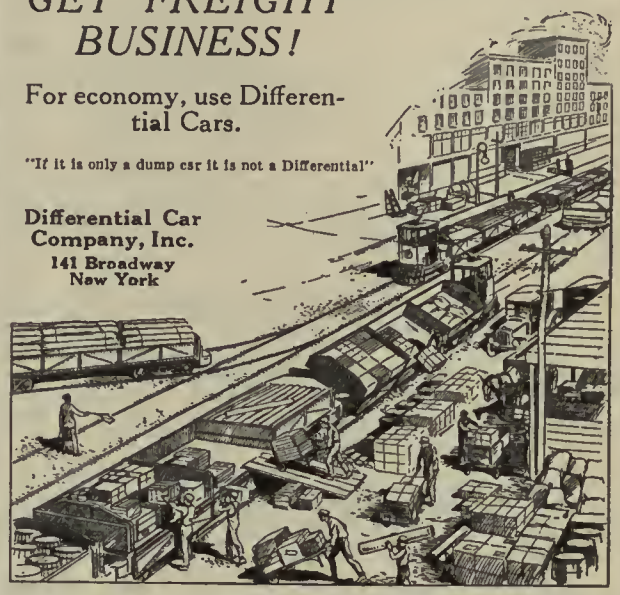
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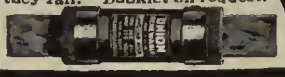
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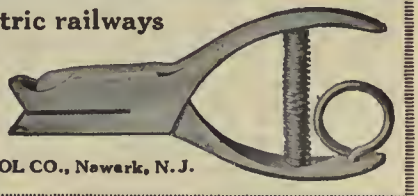
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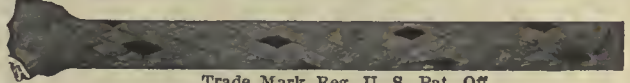
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POSITIONS VACANT.

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COMPETENT engineer wanted with experience in design of overhead line material for direct suspension and catenary line construction. State age, experience, salary and when available. P-718, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

COMPETENT master mechanic wanted for City property in Middle West. P-702, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

COMPETENT master mechanic wanted by street railway in Central West operating 70 cars; considerable portion of equipment light weight safety type; state age, previous experience, and salary desired; all replies will be considered strictly confidential. P-710, Elec. Ry. Journ., Old Colony Bldg., Chicago.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West; state experience, references, and salary desired when replying. P-605, Elec. Ry. Journal, Old Colony Bldg., Chicago.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

FIRST class street car mechanic wanted, one experienced with mechanical and electrical equipment of street cars. Address Corpus Christi Railway & Light Company, Corpus Christi, Texas.

ONE first-class armature room foreman wanted for a shop employing about thirty people. Must be familiar with all types railway armatures. State experience and salary desired. P-706, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

PERMANENT employment for first class draftsman, familiar with electric and steam railway special work, with manufacturing concern near New York City; state full experience and salary desired. P-713, Elec. Ry. Journ.

PERMANENT employment for first-class draftsman, familiar with electric and steam railway special work with manufacturing concern near New York City. State full experience and salary desired. P-719, Elec. Ry. Journal.

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TRAINMASTER for interurban, suburban and city lines. Must be capable of handling trainmen and details of operation. State experience, reference and salary expected. P-720, Elec. Ry. Journal, Old Colony Bldg., Chicago.

UTILITY company in West Indies desires services of young aggressive superintendent of street railway system; must have had similar experience elsewhere; be able to handle men and get along with labor; obtain efficient results; train employees and give the public efficient service. System operates 50 cars and 20 miles of track; only man of aggressive and efficient personality need apply. Give full particulars of past expereince, photo and reference. P-707, Elec. Ry. Journal.

POSITIONS WANTED

A CHANGE of position is desired by a young man experienced in street railway shop work; now engaged as assistant to superintendent of equipment. PW-715, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CAPABLE technical man of proven executive ability, now employed, seeks opportunity in responsible position with a property where initiative and dependability are valued; 14 years' experience electric railway field; 10 years responsible charge of work; thoroughly competent in the design, maintenance and operation of equipment; successfully handled labor; experienced in making reports on traffic and methods of effecting operating economies. PW-708, Elec. Ry. Jornal, Old Colony Bldg., Chicago.

CLAIM agent 40 years old, active and full of life, long experience, desires to make change; expert shorthand writer, obtaining most thorough information investigating accidents, from both injured and witnesses; motormen and conductors most carefully instructed; fine record on low settlements; take own photos of accidents; thorough and up-to-date office system installed; excellent references. PW-694, Elec. Ry. Journal.

ENGINEER with broad experience desires position in constructing, maintaining, rehabilitating and appraising electric street and interurban railways. PW-711, Elec. Ry. Journ., Old Colony Bldg., Chicago.

POSITIONS WANTED

EXECUTIVE open for engagement, experienced in management and operation of railway and electric properties; thoroughly conversant with accounting, purchasing, finance, public policies, rates design and construction; references furnished if desired. PW-717, Elec. Ry Journ., Old Colony Bldg., Chicago.

FOREMAN — Experienced in overhauling and maintenance of rolling stock, motors, etc.; handle men to advantage; best references. PW-712, Elec. Ry. Journ.

MAN, age 35, 16 years' experience in transportation departments as platform employee, inspector, instructor, dispatcher and assistant superintendent. Good schedule man. At present employed on property operating 90 cars. Will accept position offering advancement. PW-703, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

MAN, with 15 years' experience as general foreman and superintendent in street railway and lighting construction, is open for good proposition; can produce results. PW-716, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

MASTER mechanic, age 35; 15 years' experience maintenance railway equipment, including M. U. control and safety cars; personally first-class armature winder and machinist; excellent references. PW-721, Elec. Ry. Journal.

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Also 10-kva., 6600/110/220-volt transformer.
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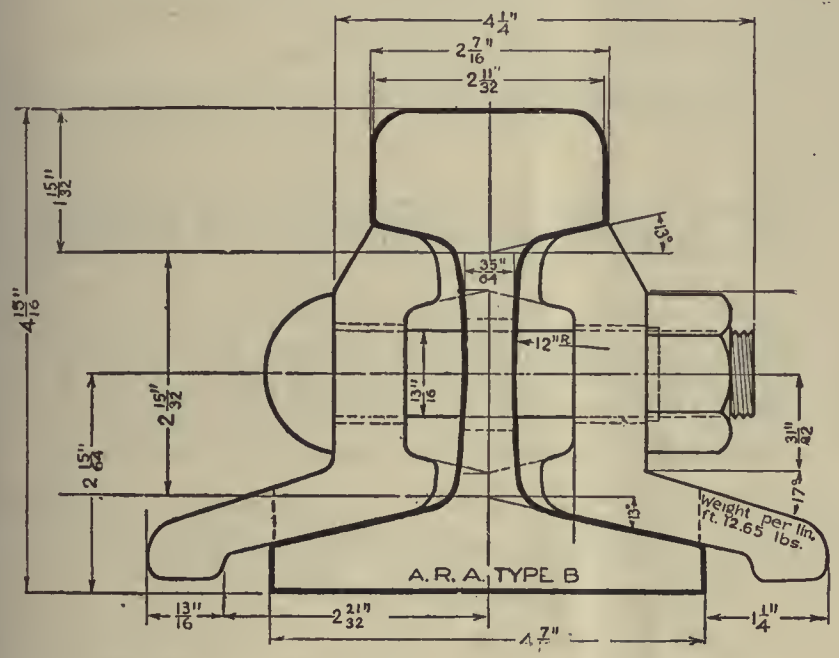
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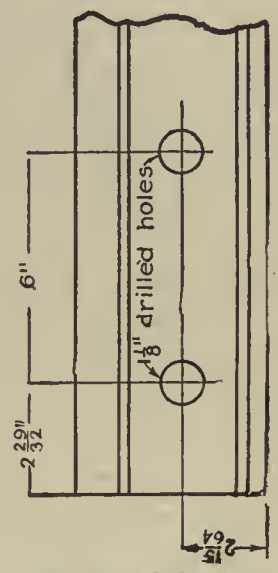
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Switchboard and misc. auxiliary equipment

NEWBURY, MASS.:

3—115 hp. Kendall Horizontal Return Tubular Boilers
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2—220 kw. Walker Eng. Type Multipolar D.C. Generators
1—55 kw. G. E. Direct connected 200 volt Booster Set.
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Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Bush Electric Co.

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General Electric Co.

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Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

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Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg Co.

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General Electric Co.
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Conveyors, Coal and Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

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Green Eng. Co.
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Copper Clad Steel Co.

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International Register Co., The
Roebling's Sons Co., John A.
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Samson Cordage Works
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Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

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Creaghead Engineering Co.
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Wiah Service, P. Edward

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National Pneumatic Co., Inc.
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General Electric Co.

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National Pneumatic Co., Inc.

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Ohio Brass Co.

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Hemphill & Wells
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Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

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Westinghouse Traction Brake Co.

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Westinghouse Elec. & Mfg. Co.

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National Ry. Appliance Co.
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Smith Heater Co., Peter

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Ohio Brass Co.

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Electric Service Supplies Co.
General Electric Co.
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Mitchell-Rand Mfg. Co.
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Ohio Brass Co.
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Drew Electric & Mfg. Co.
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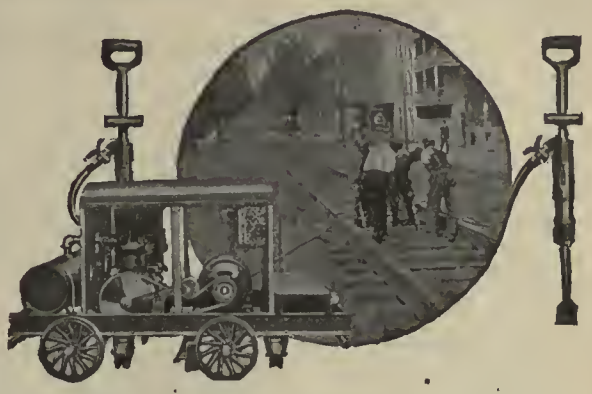
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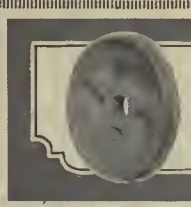
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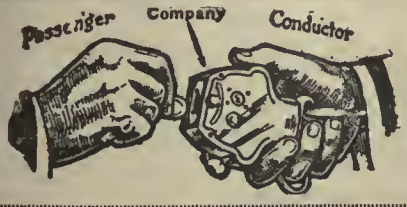
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McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Irving Iron Works
Universal Safety Tread Co.

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Irving Iron Works

Steps, Safety
Irving Iron Works

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Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

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Roebling's Sons Co., J. A.

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Lackawanna Steel Co.

Subway Grating
Irving Iron Works

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

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Ramapo Iron Works

Switches, Track (See Track Special Work)

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Railway Utility Co.
Smith Heater Co., Peter

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Electric Service Supplies Co.

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Globe Ticket Co.

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Lackawanna Steel Co.

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Dayton Mechanical Tie Co.

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Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

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Williams & Co., J. H.

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Bush Electric Co.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Williams & Co., J. H.

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Hubbard & Co.
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ELECTRIC RAILWAY JOURNAL

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East Pittsburgh, Pa.

K-132



No. 306-CV



No. 547-C

Westinghouse

Vol. 56, No. 8 New York, August 21, 1920 Pages 347-394

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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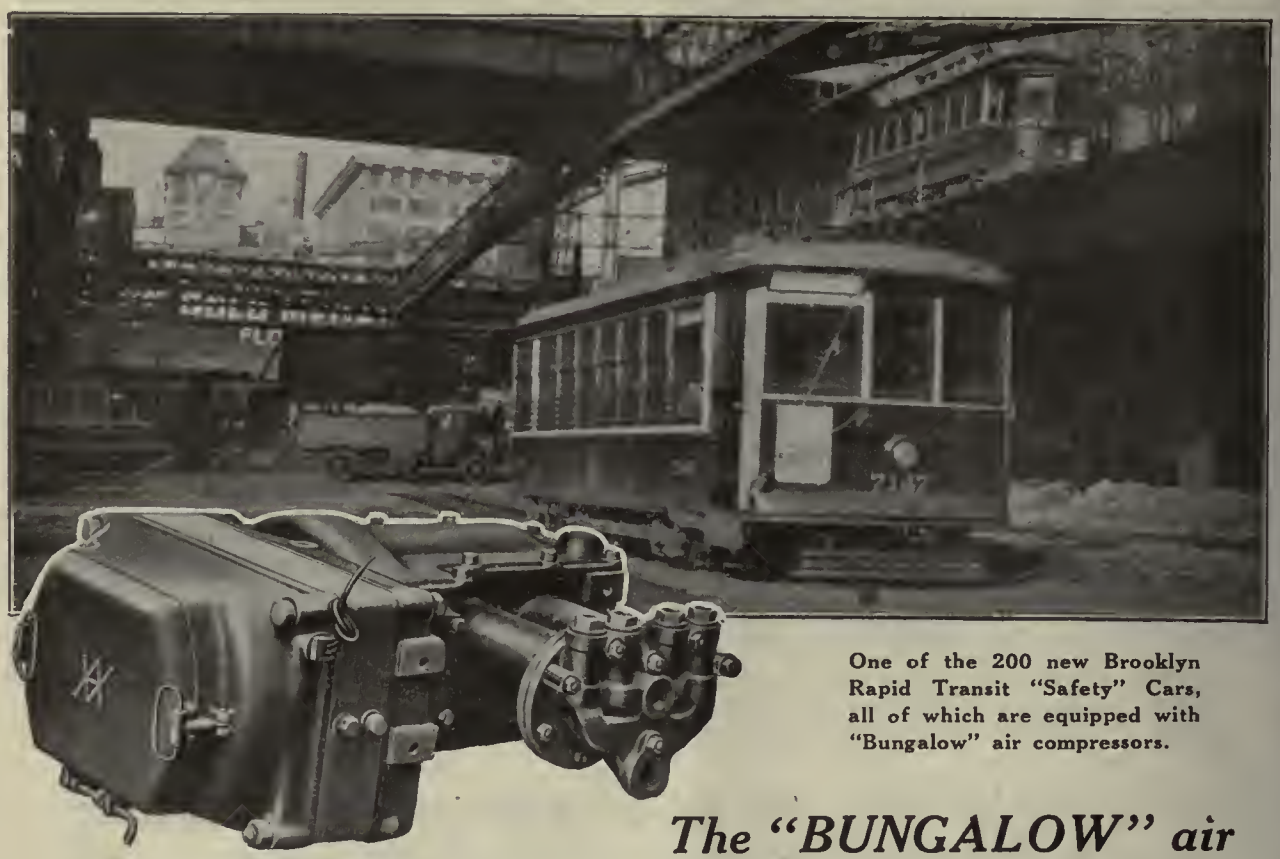
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Advertising Indexes—Alphabetical, 80; Classified, 74, 76, 78; Searchlight Section, 69-73



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"Bungalow" type air compressor

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East Pittsburgh, Pa.

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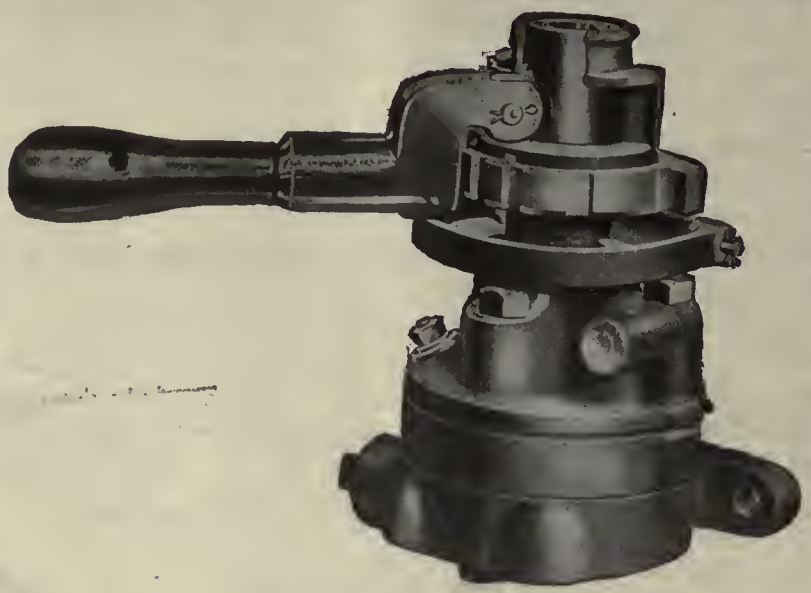
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>
> *(Signed) H. Z. OSBORNE, Jr., Mayor.*

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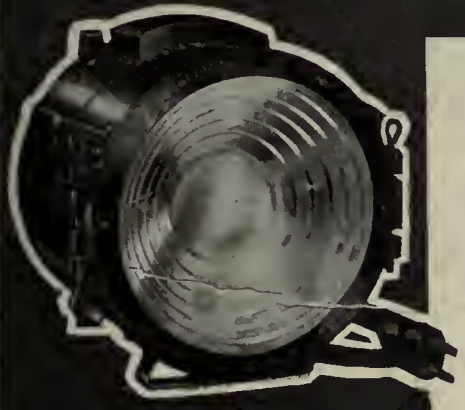
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And the light must be independent of voltage variations.

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Wherever There's Feeder in Parallel



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Because of that sound principle, the New Orleans Railway and Light Company now has 150 out of 218 miles in Phono-Electric.

Here's a company that sees the fallacy of rapidly wearing away the principal conductor, instead of using copper feeder for transmission and Phono-Electric wire for contact.

That's why you will find Phono-Electric on many residential streets of New Orleans, as you will on all business streets of that city.

Bridgeport Brass Company

Bridgeport Connecticut

2236



INTERNATIONAL
STEEL CROSSING FOUNDATIONS

take the trouble out of compromise joints near Crossings

THESE specially designed Steel Foundations for troublesome Crossings save maintenance and prolong frog life, but one feature welcomed by many electric railways is the compromise joint step, built into the foundation, which carries the high rail of the street track into the arms of the crossing.

The familiar battered low joints at crossing connections may become dangerous if frequent attention is not given to them. They are the cause of much expense.

But on a firm steel bearing cushioned with wood, compromise joints are trouble-proof and safe.

Most of our recent orders are from electric railways who have from four to ten crossing foundations in service.

Let us prepare proposal plans on your Fall renewal.

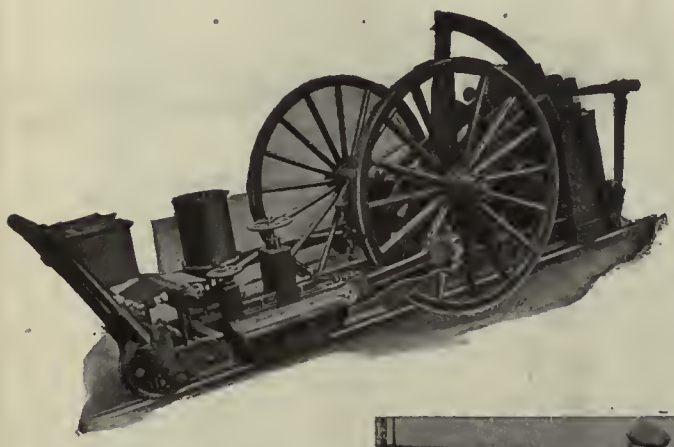
The International Steel Tie Company

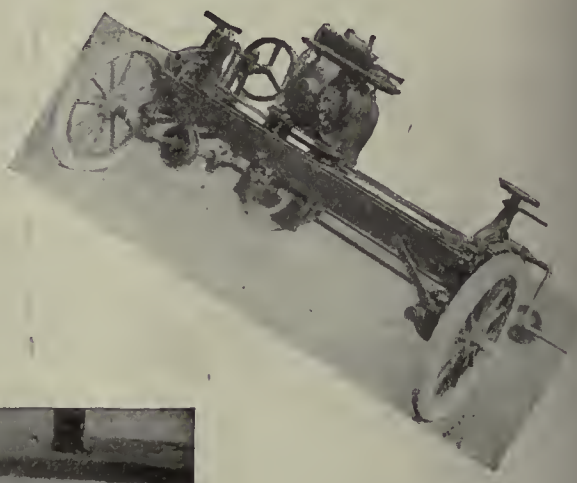
Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

THREE TRACK GRINDERS

that solve every problem







Add Years to Your Track Life and Reduce Maintenance Charges.

The Reciprocating Track Grinder has given excellent results to more than 200 railways for removing corrugation and grinding new or slightly cupped joints.

The Atlas Rail Grinder and the Universal Rotary Track Grinder have proven reliable and efficient for smoothing the surface of a joint after welding and for getting into switches, frogs, crossings, and special work.

Regardless of what your track problem may be, we have the solution in one or more of our track grinders.

Let Us explain in detail

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

Exclusive Agents:
ATLAS RAILWAY SUPPLY CO.
Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO.,
Pittsburgh, Pa.

Exclusive Agents:
CHAS. N. WOOD CO.,
Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc.,
77A Queen Victoria St., E. C.,
London, England.

These Keystone Specialties are Standard Equipment on nearly all Safety Cars.



Golden Glow Headlights



Keystone Rotary Gongs



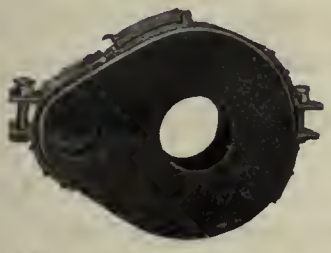
Keystone Air Sanders



Keystone Trolley Catchers



Faraday Car Signal Systems



Keystone Steel Gear Cases



Keystone-Hunter Destination Signs

Always specify them for they will serve you well. Write for Bulletin No. 167, showing many other Keystone specialties for use on safety cars.

Golden Glow Railway Headlights



Unquestionably the most desirable headlights for electric railway service because they are fitted with the famous Golden Glow mirrored glass reflectors. These reflectors are accurately ground and polished by a patented process and being made of glass they will never tarnish; they will never require repolishing; they will retain their initial high efficiency for years.

Write for data sheets showing many different types and sizes.

ELECTRIC SERVICE SUPPLIES CO.

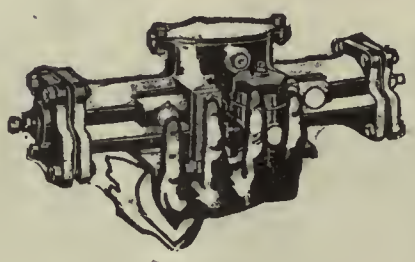
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA 17th and Cambria Streets
NEW YORK 50 Church St.
CHICAGO *Monadnock Building*

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

Yes! It Will Pay To

Standardize!



If you will have us pneumatize your cars to make them fit, safe and economical for your four to six hour-a-day peak loads.

Don't let the matter of dead weight per seat worry you.

If you use these heavy cars when you ought to use safeties, you are offering probably *two* seats for *one* passenger—so that the dead weight per seat is serious.

At 1200 lb. per seat that means propelling 2400 lb. of wood and metal for the sake of 140 lb. of passenger. In that case, the 550-lb.-per-seat safety is the only economical car.

But during the rush hours when there may be *two* passengers for one seat, that 1200 lb. per seat works down to but 600 lb. per seat. Not so bad after all for short periods and the handling of the heavy traffic "spill-over".

Make your peak periods produc

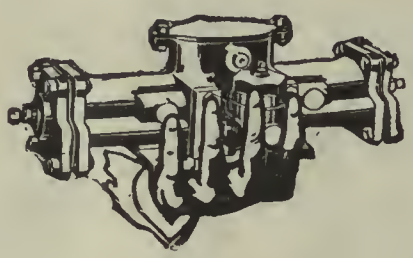
National Pneumatic Company, Inc.

50 Church Street, New York Edison Bldg., Chicago

Works: Rahway, N. J.

Retain Your Big Cars!

Pneumatize!



When you get 'round to buying *new* big cars, you can take advantage also of lower weight per seated passenger; but it's plain that it would not pay you to scrap the present big cars on the basis of rush-hour power savings alone.

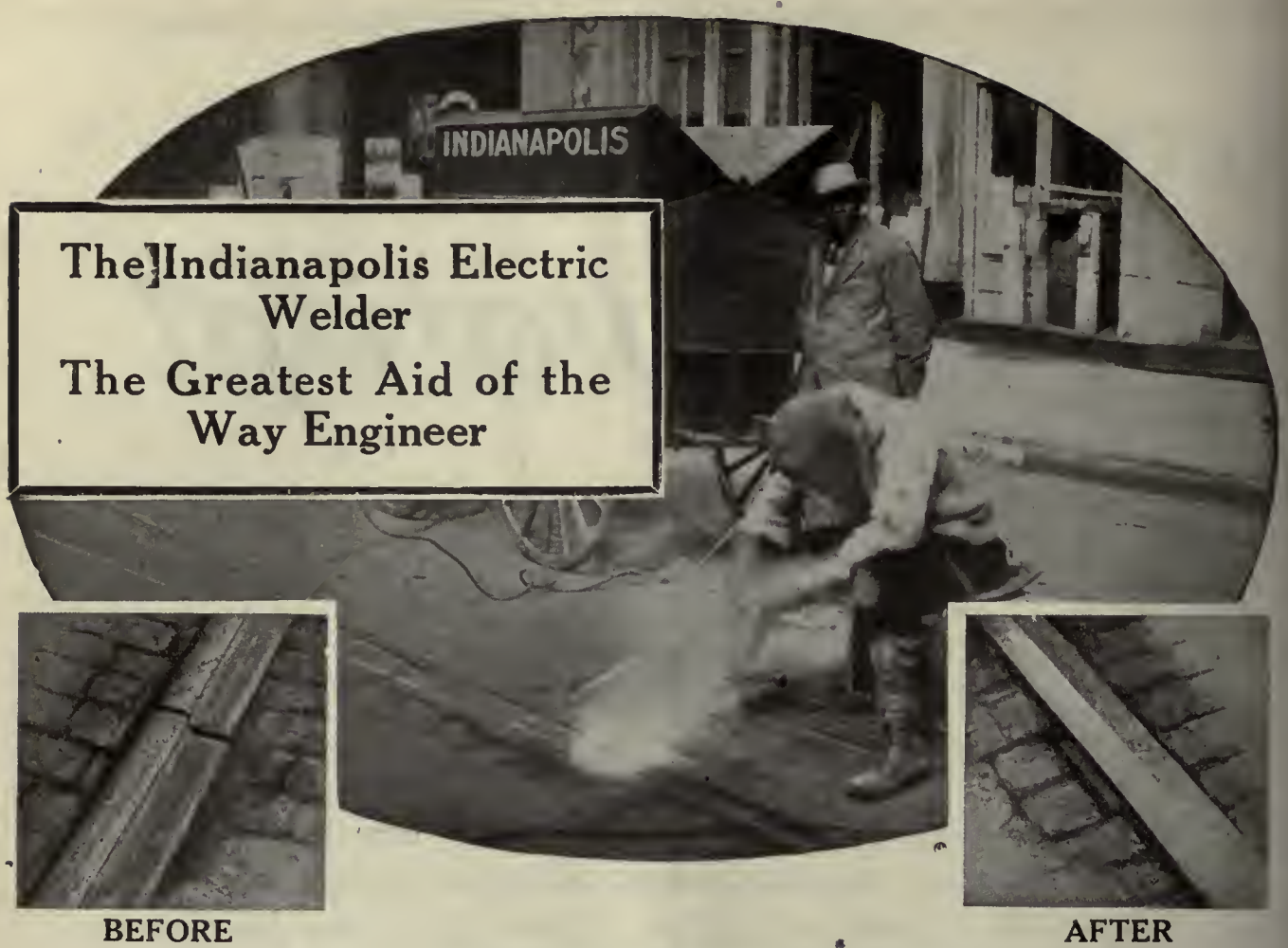
What your big cars need to be economical in platform labor, safe in most arduous service and adaptable to any kind of prepayment and postpayment is to be pneumatized to "RUSHOUR" TYPE by means of National Pneumatic Door Engines (standard in the famous safety combination of the Safety Car Devices Company), Motorman's Signal Lights, Safety Interlocking Door Control and Door and Step Mechanisms. It is only through standardization with this group of speed-up devices that you can

maximum profit and efficiency

National Pneumatic Company, Inc.

50 Church Street, New York Edison Bldg., Chicago

Works: Rahway, N. J.



The Indianapolis Electric Welder

The Greatest Aid of the Way Engineer

BEFORE

AFTER

BEFORE AND AFTER

1. Low joints, which collect water.
2. Rail ends cupped and bent.
3. Rail ends 3/16 to ¾ or 1 in. apart.
4. Splice bars all battered down.
5. Bonds loose and broken off.
6. Power losses enormous.
7. Mechanical joints falling apart.
8. Cars bump and jar over joints.
9. Dissatisfied passengers.
10. High Track Maintenance.

1. Smooth, easy riding track.
2. Rail joints lifted and ground.
3. Rail ends firmly together.
4. No bolts, no bonds.
5. Conductivity greater than that of unbroken rail.
6. Power losses a minimum.
7. Pleased passengers.
8. Reduced Track Maintenance.
9. Savings made from the start.
10. Equipment pays for itself in sixty days.

The greatest aid of the Way Engineer

Write for Details

Indianapolis Switch & Frog Co.

Springfield, Ohio



Conductivity tells the story of the place of copper in the Electrical Field.

Wire of high conductivity with the necessary tensile strength and elongation is the product which all wire manufacturers are striving to produce.

Anaconda Copper Wire is drawn from B & M electrolytic copper, the average conductivity of which is 100.75% Mathiessen's Standard.

Anaconda Wire meets or exceeds all the specifications of the American Society for Testing Materials.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department
Mills—Great Falls, Montana
General Office: 111 *W. Washington St., Chicago*

Stranding Room, Anaconda Mills, Great Falls, Mont.





ANACONDA Copper Wire
"From Ore to Finished Product"



PRACTICAL SAFETY

In these "Safety First" days agitation often masks action. Trackage is not safe unless equipped with automatic signals which easily tell the motorman how far he is from an opposing car.

U. S. Electric Signals supply that *practical* safety that is lacking in hand operated signals. The human element cannot enter. U. S. Signals tell at a glance which car has the right of way—they prevent rear end collisions, too.

Let us send you bulletins telling why U. S. Electric Signals never fail.

United States Electric Signal Company

West Newton, Mass.



CHAPTER FIFTEEN

THE ALL-*BUT* PERFECT STATE

And the Ladies (Bless 'em) Shall Be Considered

In the All-But Perfect State the women will have the first consideration of railway executives (during business hours, we mean).

The matter-of-fact railway man may ask why.

Simply because they are the backbone of any street railway.

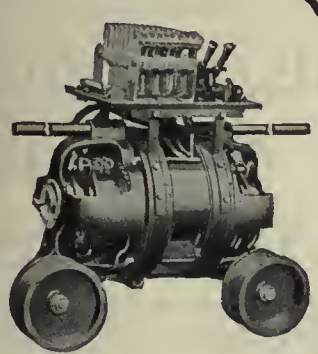
Just take a look at the jitney—see them plunging along filled with a hodge-podge medley of butcher, baker, coal passer and tightwad. But did you ever see any refined ladies out a jitneying?

Not on your three score and ten.

Now following this line of logic—did you ever see a lady who didn't have the upper hand and half-Nelson on her hubby? (This question you need not answer.)

So, if you sell your railway to the ladies rightly—they'll resell it to the men.

Wherefore in the All-But Perfect State the slogan will not be "Safety First" but rather "Ladies First," then the Dynamotor.



READING NUMBER FIFTEEN

Q. Why mention the Dynamotor in the same category as passengers?

A. Because as an income producer the Dynamotor comes next to passengers. It conserves the passenger income more than any piece of equipment you can install—as a bonder for Lincoln continuous bonds—for Lincoln Process Welded Joints—and for shop welding.

Rail Welding and Bonding Company

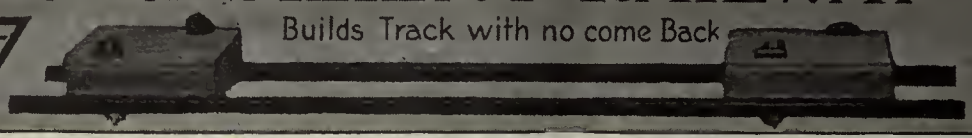
Formerly The Lincoln Bonding Co.



Cleveland. Ohio.

The RESILIENT RAILWAY TIE

Builds Track with no come Back



Concrete was never accused of having the property of

Resiliency

yet as a track foundation "it has its points."

You can put resiliency into this most excellent of road beds by the use of Dayton mechanical Ties.

The Asphalt cushion in this Resilient tie dissipates the shock of heavy traffic, and makes riding on concrete as easy as on pneumatic tires.

It's the Tie that does it.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO



—backed by Chicago Pneumatic Service

EVERY user of electric drills knows this to be a fact—

Even a mechanically correct electric drill, to *maintain* its efficiency, must be backed by a *practical, personal-touch* service.

The practical service rendered users of Little Giant Electric Drills is, in addition to correct design, a direct result of a nation-wide chain of Service Stations.

These Service Branches insure prompt delivery of new tools and spare parts. Connecting up the user with this service are seasoned Service Engineers. This means better drill performance—the *right* drill on the job *all* the time.

Little Giant Portable Electric Drills are made in a complete line in A.C., D.C., and Universal types. Capacities $\frac{3}{16}$" to $1\frac{3}{4}$" drilling in metal.

Ask for Booklet 397.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building · 6 East 44th Street · New York

Sales and Service Branches all over the World

•Birmingham •Boston •Buffalo •Chicago •Cincinnati •Cleveland •Detroit •El Paso Erie Franklin Houston Joplin •Los Angeles •Minneapolis •New Orleans •New York •Philadelphia •Pittsburgh •Portland Richmond Salt Lake City •San Francisco •Seattle •St. Louis Barcelona •Berlin Bombay Brussels Buenos Aires Cadiz Christiania •Fraserburgh Havana Honolulu Johannesburg Lisbon •London Madrid Milan •Montreal Osaka •Paris Seoul Tokyo Toronto Vancouver Winnipeg

EL-23

BOYER PNEUMATIC HAMMERS · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · VACUUM PUMPS · PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES · ROCK DRILLS · COAL DRILLS

LITTLE *Electric* **GIANT** *Tools*

Collier Service

Just One Example of What Goes Into Collier Service

It would take a large volume to describe the organization that has made Collier Service synonymous with the best in car-card advertising.

But perhaps a reference to but one sub-department of the Collier Service organization may help to give a conception of the whole.

This is our perpetual inventory of Collier Service cars whereby we maintain records of scores of thousands of cars, not merely by number, but by location and the names of the advertisers' cards occupying the spaces, the kind of card on display, when each card was installed, when it is to be removed, and so on.

The cost of maintaining this particular means of seeing that every Collier Service advertiser is treated according to contract and that your car-card space is used to bring the utmost in results to all parties in interest runs over $200,000 per year.

Barron G. Collier INCORPORATED

Candler Building, New York

Clinching our Arguments

IT'S a simple matter to *guarantee* the efficiency of a piece of equipment but woe to the man who makes this guarantee without thought of backing up his claims.

Actions always speak louder than words. That's why, when arguing the merits of Johnson Fare Boxes, we prefer to *show* how more than 260 electric railways are approaching the ideal of maximum fare collection with this equipment. Citing actual examples of increased revenue means more than the bare statement—"Johnson Boxes will save 3 to 10% of your gross revenue."

WE have on file in our office an immense fund of data—concrete evidence showing just how Johnson Fare Boxes reduce operating costs, speed up schedules and check in increased revenue at the treasurer's office.

This data is at your disposal. Write to our engineering department today.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

—how individual lubricating service reduces lubricating costs

The Ideal Lubricant

Name over the characteristics of the ideal lubricant and see if your list isn't about like this:

(1) It should be uniform and scientifically compounded (2) It should contain a very low ash content (3) It should contain no filler (4) It should be free from acid or appreciable amount of alkali (5) It should not become rancid or gummy after standing (6) It should remain practically the same under any climatic condition (7) It should be of proper consistency for the load carried (8) It should form a perfect film on the bearings at all times without channeling.

These features are all inherent characteristics of Tulc. That's why Tulc is the most economical lubricant on the market today.

Our Booklet "Results" contain complete data. Write for a copy.

THE UNIVERSAL LUBRICATING CO.
Cleveland, Ohio
Factory: Sweeny Ave. Office: Schofield Bldg.

TULC + Universal Service

DIXIE

Confirmed by Law and Usage
is the
Penny Cup Vending Machine

Leading stores, theatres, hotels, amusement parks and other public resorts have installed them for the comfort and convenience of their patrons.

One hundred and fifty railroads have solved their drinking cup problem with

DIXIE Cup
Penny Vending Machines
For Passenger Cars and Stations

This service is standardized and popular everywhere. It is self-supporting — *not an expense.*

People are glad to pay a cent for a round, clean paper cup, shaped like a glass, but pleasant and safe to use.

Your passengers will appreciate the convenience.

Write us for sample cups and terms.

INDIVIDUAL DRINKING CUP COMPANY, INC.
Original Makers of the Paper Cup
HUGH MOORE, President
220-230 West 19th Street, New York





TEXACO LUBRICANTS

for railway shop, power plant and rolling stock

Texaco Lubrication Engineers will gladly assist you in selecting the right Texaco Lubricants for your shop—power-plant, rolling stock, or any other equipment.

You may call upon them to make a survey of the equipment if necessary. This is Texaco Service—there is no charge.

THE TEXAS COMPANY

Dept. RJ, 17 Battery Place, New York City
New York Chicago Houston

Offices in Principal Cities

ACKLEY BRAKES
Found The World Over

"The Painful Experience of what a brake ought not to be"—

That's what a prospective customer said he was suffering from.

It's different now. He has installed

ACKLEY BRAKES



The Double Eccentric Winding Drum with Automatic Check Chain System will solve your brake troubles, too.



LET US SHOW YOU!

The Ackley No-Staff—Bulletin D

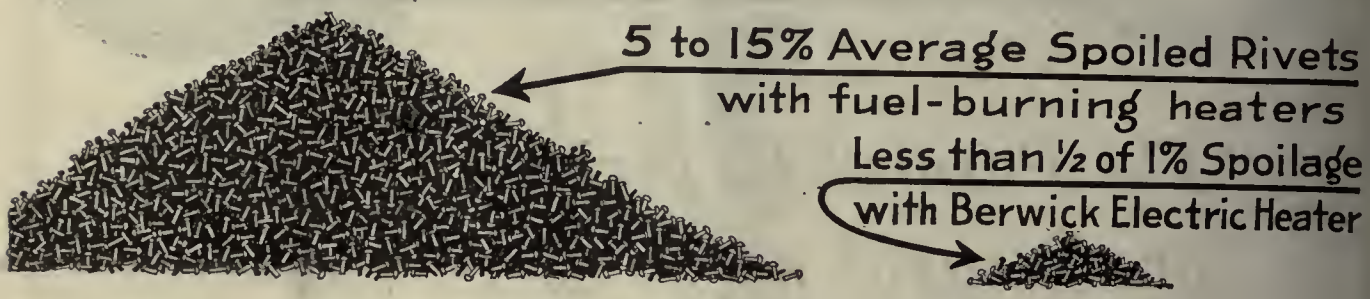
The Ackley 2-E (Staff)—Bulletin E

ACKLEY NO-STAFF TRADE BRAKE MARK

ACKLEY BRAKE & SUPPLY CORPORATION
G. S. ACKLEY & COMPANY, REPRESENTATIVES
50 Church Street, New York, U.S.A.
Agencies throughout the World
Cable address "Acklebrake"

ACKLEY 2-E BRAKE

How many spoiled rivets go into *your* scrap heap?



A leading trade paper, after investigating throughout the country, places loss of rivets in average plants at approximately 15 per cent. Most of the loss is due to burning and scaling (or oxidation) in fuel-burning heaters.

The Berwick Electric Heater reduces this loss to less than ½ of 1 per cent. Every rivet is in plain view while being heated, and inspection is not hampered by flames, smoke, or intense heat. Only gross carelessness can permit any loss whatever from overheating.

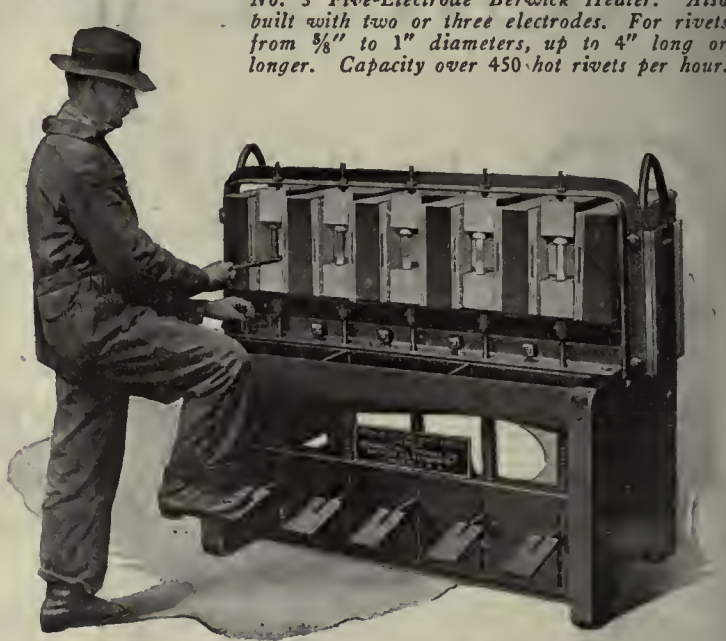
BERWICK ELECTRIC RIVET HEATER

The average loss with fuel-burning heaters, figuring rivets at $4 delivered, is at least 40 cents per hundred pounds. Practical elimination of this waste is only one of the savings effected by Berwick Electric Rivet Heater.

Note These Features:

—Low operating cost. Less than 20 kilowatt-hours per hundred pounds of rivets heated.
—No smoke, gas, dirt, or excessive heat.
—Fire risk eliminated.
—Hot rivets in 20 to 30 seconds after starting.
—Time-saving portability. Heater can be placed close to work. Often eliminates sticker-boy.
—Power used only when hot rivets are needed.
—Uniform heating. Radiation from center of rivet outward.
—Safe. Simple to operate. No complicated wearing parts. Negligible maintenance cost.

No. 3 Five-Electrode Berwick Heater. Also built with two or three electrodes. For rivets from ⅝" to 1" diameters, up to 4" long or longer. Capacity over 450 hot rivets per hour.



Send for catalogue. Mention size of rivets used, capacity required, and alternating current conditions.

American Car and Foundry Company

165 Broadway, New York

9



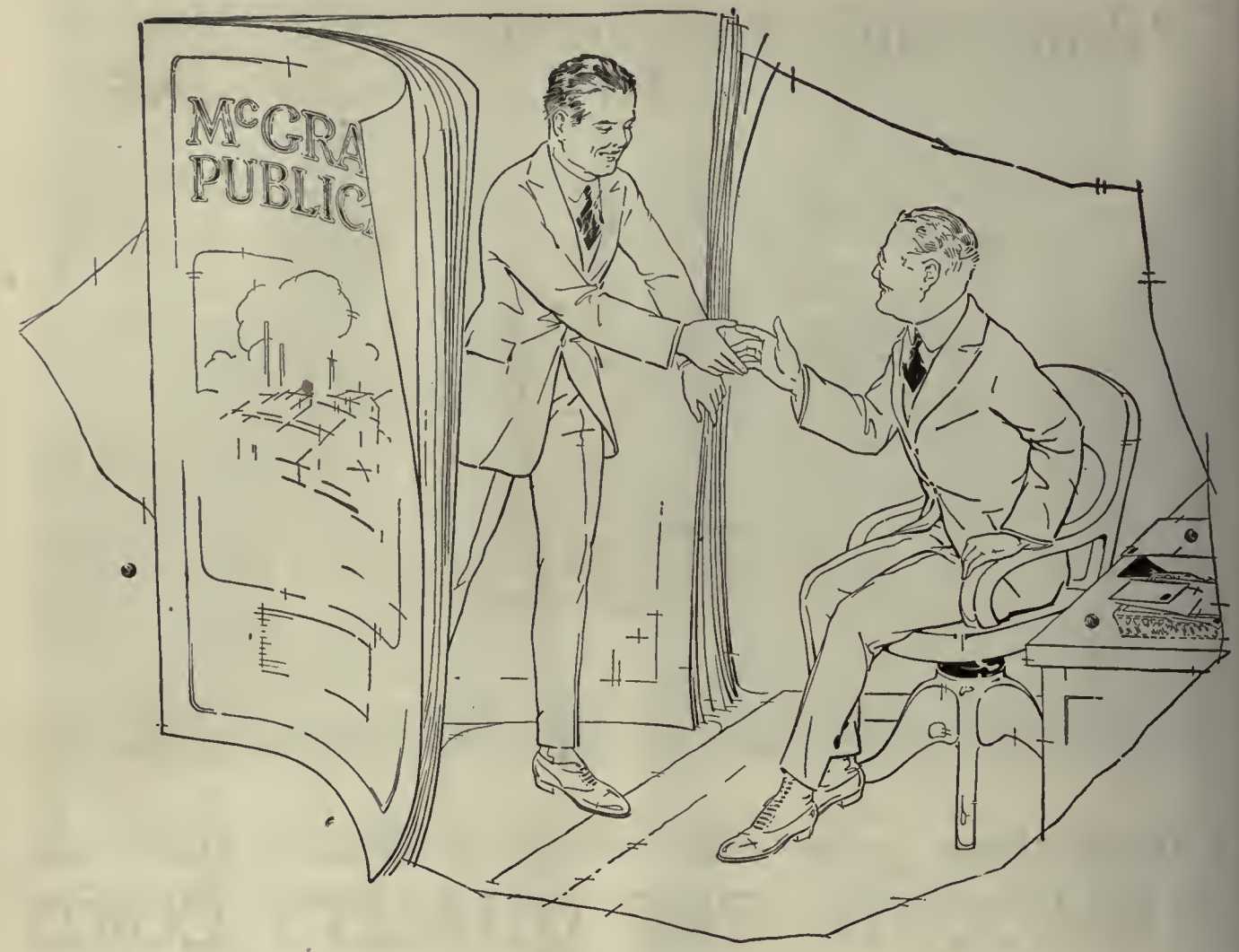
Thoughtless men may drop a brake shoe on DURACORD - THE QUALITY CORD

It may be dragged over metallic dust, allowed to lie in oil puddles or pulled around the sharp edges of brick or metal posts but because it *is* Duracord and not ordinary cord, this *combination* of wire better-than Underwriter's rubber and the famous woven cover will stand a tremendous amount of abuse before short-circuits become a possibility. Send for samples of Duracord and ordinary cord. Duracord will prove a worthy companion to

DURADUCT
THE QUALITY CAR CONDUIT

With the black dotted line on the interior surface, so favorably known to hundreds of electric railways as the only original and non-metallic conduit with a single interwoven wall and roller-bearing wireway. Duracord comes in all sizes from No. 18-2 conductor for extension lamps to No. 0000 single conductor for welding and motor leads; Duraduct for every size in which car wires singly or in groups are required.

Tubular Woven Fabric Co., Pawtucket, R. I.



"I Have Time for Every Salesman"

One of the busiest engineering executives in this country remarked the other day that he saw every salesman who called at his office.

"I have time for every one of them," he stated, "because I do not dare run the risk of missing some new information regarding engineering equipment." Every man who calls is given an audience and the busy executive says it pays. Besides saying so, he can prove it.

As a reader of the best technical journal with a carefully picked staff of editors and products, you owe it to yourself to meet the manufacturers' printed salesmen who are waiting to see you in the advertising pages. Every one of them has a message for you. Only by giving each of them an audience can you be certain of cashing in to the full on the service rendered you by one of the greatest technical publishing organizations in the world.

Read your McGraw-Hill publication from cover to cover

The 11 McGraw-Hill Publications

McGraw-Hill Co., Inc.
Tenth Avenue at 36th Street
New York

Power
Coal Age
American Machinist
Electrical World
Electrical Merchandising
Journal of Electricity
Electric Railway Journal
Engineering News-Record
Ingenieria Internacional
Chemical & Metallurgical Engineering
Engineering & Mining Journal

H-11

"Where am I going to be 10 years from now?"

EVERY *thinking* technical man should look certain fundamental facts straight in the face.

And the most important of these facts is:

"In traveling towards success, am I on the shortest road—the safest road—the *surest* road?"

What is *your* answer?

An industrial need of the hour is for better leaders—better executives trained to lead intelligently, efficiently, profitably.

As Mr. Charles M. Schwab says in his book, "Succeeding With What You Have": "When we decide to build a new plant the question isn't 'will it pay?' but *'can we find the right man to manage it?'*"

The need for the right man is all around us

IT is in every factory, every office, every industry, every selling organization.

Men with confidence, men who know—men whose ability is backed up by *knowledge* and *understanding* of the fundamentals of industry are needed *everywhere*.

The Alexander Hamilton Institute offers you the successful experience of thousands of successful men. Intensely interesting, it grips and thrills a technical man with business facts and fundamentals that inspire him and help him.

What you do ten years from now depends upon what you do today in training yourself for the future.

There is only one way of judging the future, and that is by the past. Judge your own past. Does the present realize your hopes of ten years ago?

The most important function an executive performs is making decisions,



often instantaneously. To do this here are a few of the fundamentals that your "Chief" knows, and that you, too, must train yourself to know.

The real executive knows Production—How to keep one department from being idle while another department is working overtime. That there must be no unnecessary friction. If there is loss—he studies how to remedy it. If there is waste—he learns how to prevent it.

He knows Finance—What the company's bank account is worth to the bank—how the banks determine the value of such an account—how to secure and sustain the greatest co-operation possible from different banks.

He knows Marketing—Your modern, highpowered executive knows selling, advertising, traffic, transportation, exporting and importing. He knows where future markets are—he is studying how to reach them profitably.

He knows Accounting—An executive is studying production and marketing all the time—watching it with machine-like precision. His finger is on the pulse of the financial end of the business—he scrutinizes the charts and figures of the Accounting Department.

He appreciates industry's relation to Government—he is beginning to go deeper into those economic principles that tend towards greater personal efficiency in labor—thru education, the personal happiness of each workman and each workman's family.

Have you any reason to believe that conditions will be any different with you in ten years unless you utilize the present in the most advantageous and profitable way you possibly can?

What can be accomplished in 10 years

THE greatest industrial organization in the world—the U. S. Steel Corporation—was built in ten years.

Hundreds, yes thousands, of men ten years ago were at the bottom of the ladder. Now they are at the *top*.

In our files are scores of letters from men who have made huge strides forward in a few years, after following the Course. This progress is possible for you if you will do your part, by seeking the right road, and traveling it. The Alexander Hamilton Institute shows you the way.

11,000 *Technical Men*

THE Institute was founded ten years ago. It has only one course. Its training is designed for the man who knows one department of business or industry and knows it well, but lacks the all-round knowledge of the other departments.

To such a man it gives a working knowledge of sales, accounting, merchandising, factory and labor problems, office organization, advertising, costs and corporation finance—the sort of training in a few months which would require years if a man acquired it by practical experience in each department.

From the very beginning the Institute had a special appeal to technically trained men. Of the thousands of men who have enrolled in its Course more than 11,000 are technical men. To their technical training they have added business knowledge, a combination which makes the very highest type of business executive.

"Forging Ahead in Business"

IF you are determined to forge ahead take the first step in your future success. Send today for a copy of our 116-page book, "Forging Ahead in Business," which will be sent you without obligation.

Alexander Hamilton Institute
889 Astor Place, New York City

Send me "FORGING AHEAD IN BUSINESS," which I may keep without obligation.



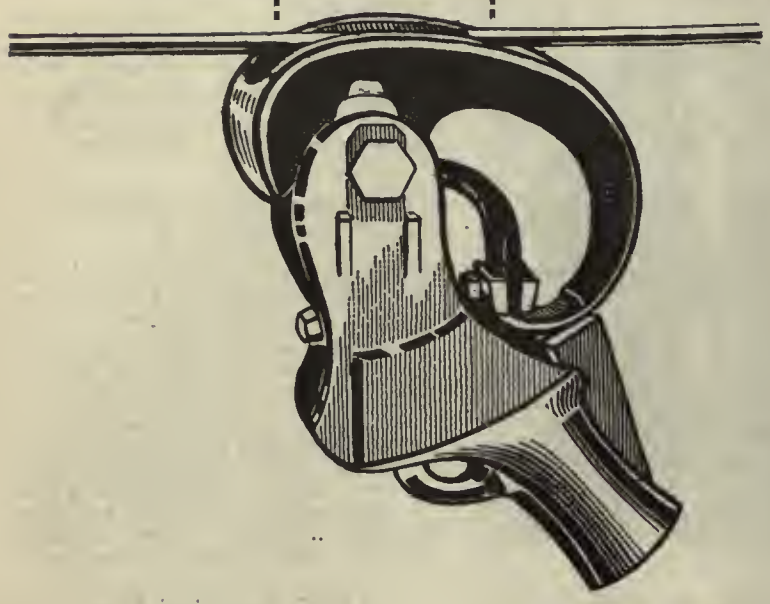
Name .....
Print here

Business Address .....

.....

Business Position .....

←3"→ CONTACT



In all current collecting devices the more contact you have the less friction exists owing to the tension being distributed over a greater surface.

Miller Trolley Shoe operation proves that the greater the contact surface more power is delivered to the motors, giving greater capacity for overloads.

THE MILLER TROLLEY SHOE

has a contact on the wire of 3 inches. This contact is permanent. The Shoe follows each little uneveness in the wire. It does not jump and eliminates all sparking.

Miller Trolley Shoes have solved many problems that were the outcome of low voltage.

We stand ready at all times to show you on your own lines just what an advantage can be obtained by equipping your cars with the Miller Trolley Shoe.

Write Today for Details

Miller Trolley Shoe Co., West Newton, Mass.

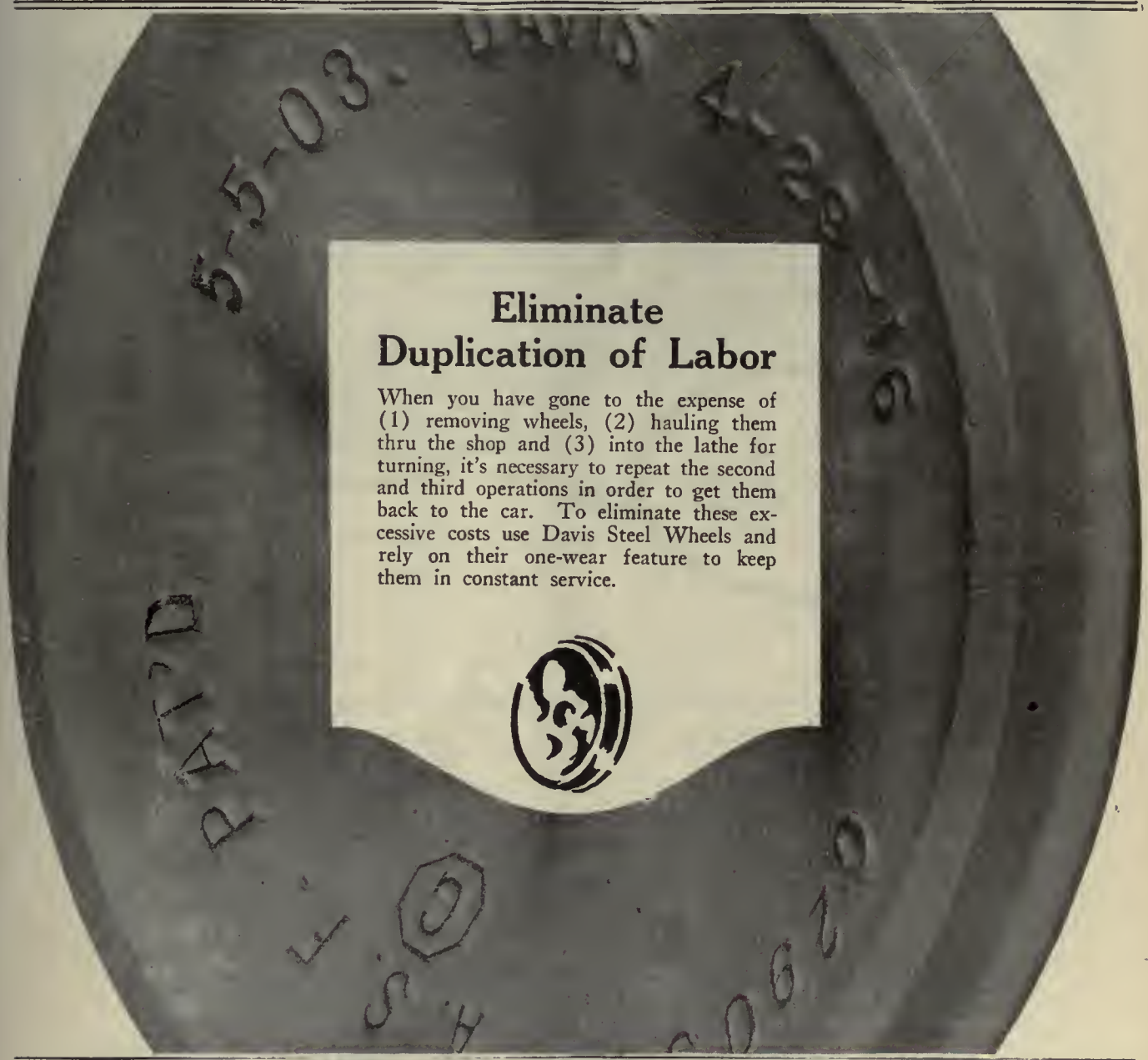
SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

SALES REPRESENTATIVES:

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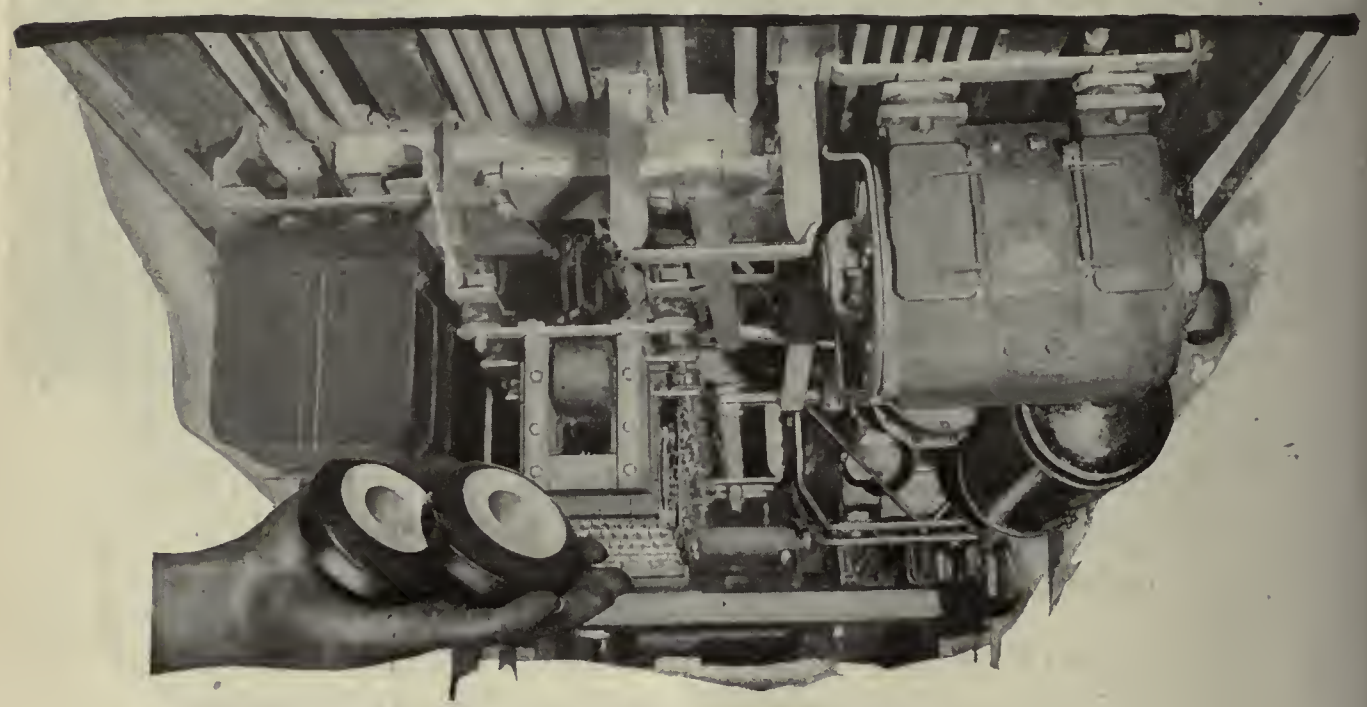
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Manufacturers Are Helping Establish "Good Will"

IN LAST week's issue and also in that of Feb. 7 we published short articles about the kind of publicity and public advertising that the Western Electric Company is doing and illustrated them with some of its posters or "advertising copy." We believe this kind of action is more important and has a greater significance than can be shown in the few descriptive remarks possible.

What we see in this is the recognition of a few of the facts and ideas which we tried to emphasize in our issue of July 10, the chief of which is that messages which are for the good of the electric railway are ultimately beneficial to all connected with that industry, and further that one's own self-interest, correctly analyzed, should lead him to a realization of his own dependence upon the success of the industry in which he lives and works. The Western Electric Company has no monopoly of the idea, but it is doing a wonderful piece of work along this line.

One important fact is that this sort of publicity is effective, if the surprisingly large number of commendatory letters received by the company is any indication. If this is so, is it not worth while for manufacturers and operators alike to study the methods and principles of this publicity with a view to extending their application?

Pushing Maintenance Work Through the Shop

WHAT a world of difference there is in the way in which maintenance and repair work is dispatched in different shops! In some it is quite evident that the shop force has the work well in hand, in others the work seems to be the master. The writer recently had occasion to visit many shops on properties that stretched across the continent. He noted illustrations of the above; in fact, his observations suggested the present line of thought.

In a recent editorial in this paper the suggestion was made that research work would be found profitable on the part of any electric railway company. Nowhere is this more true than in the shop. The term "research" has an academic, "high-brow" flavor, but really every master mechanic who is alive to the possibilities of his job is doing more or less investigation. But in most cases this activity is unsystematized and desultory. A little concentration of effort would make it much more effective. In some shops there are young fellows of ability who are not loaded up with executive work to whom could be delegated the task of studying the local procedure to determine whether improvements are not practicable. While the operating department of the railway is speeding up the running schedules of the cars, the equipment department might well put a little effort on speeding up the shop schedules. All workers will put more "pep" into their efforts when the work is going with snap and system. And a small percentage of time saving on each operation will bring far-reaching results. Some one individual, however, must make it his special business to study the proposition as a whole. If the master mechanic has time to do it, he is, or ought to be, well qualified for the task. But some competent person should do it.

Manufacturers frequently call in outside specialists, sometimes termed "efficiency experts," to show them wherein their factories are wasting labor and materials through lost motion. Competent advice in such cases is a paying investment. But in the railway shop there is usually enough talent already available to accomplish the same purpose. Is any one doing this work on your property? If so we should like, for the benefit of the industry, to know what results he has accomplished.

What About Substitute Ties?

ALL careful observers have noted that the price of timber has been advancing rapidly and the experts of the Department of Agriculture have declared that more timber is being cut than is replanted. Labor is high and freight rates are to be higher yet. Most of the tie timber used by electric railways comes to them by freight, because the local supplies have either been exhausted or else they are absorbed by the steam railroads. In 1916 one could buy a first-class sawn-heart pine tie laid down in New York for about 80 cents. Today the price is about $2.50, and the quality of the timber is doubtful while the certainty of delivery is a mooted question.

With such conditions in mind, the position of the engineer who has used wooden ties in track construction to his entire satisfaction becomes uncertain, and the mounting cost must lead him to serious consideration of substitutes for his timber. As to substitutes, there are several types of steel ties which have had more or less vogue, and in the steam road field there are a number of different types of reinforced concrete ties as well as some steel ties under experimental observation.

Heretofore one of the reasons for continued use of wood ties by electric railways has been their cheapness, as compared to steel or concrete ties. But the price disparity between steel and wood has now practically disappeared, although concrete has increased in cost owing to scarcity of cement and lack of shipping facilities for stone. With steel and wood more nearly upon a price parity the use of steel ties is very likely to increase.

As to the substitute ties themselves, there are opportunities for further development and adaptation to the needs of the track. Most of these ties are designed to serve first as a tie rod or gage holder, and the

concrete in which they are usually embedded is supposed to carry the loads. We say "supposed" advisedly, because it is one of the most difficult tasks if not impossible, to get and maintain a good bearing contact between the concrete and the rail base. With some forms of steel tie the fastening devices are far from perfect and there has been a tendency in many cases to space ties too far apart in order to reduce the first cost. The reports of the board of supervising engineers, Chicago Traction, indicate the need for a spacing much closer than that of 4-ft. centers, which has prevailed. Experience elsewhere simply adds emphasis to the results of the Chicago study.

It seems to be clear that way engineers must begin to give thought to the subject of substitute-tie design, partly because the tie-timber shortage must be faced and partly because most ties now used as substitutes have been designed and promoted by manufacturing interests which may or may not have given sufficient thought to their design as engineering structures. The subject is one calling for a great deal of study. The results from existing installations, which have been sufficiently long in service, should be collected and compared.

The relation of the tie, of whatever type, to the track as a whole needs to be considered in the light of the information made available through the report of the committee on stresses in track of the American Railway Engineering Association. Tests along lines similar to those conducted by that committee and covering electric railway track conditions would furnish interesting data. It is to be hoped that the American Electric Railway Engineering Association may soon find time to give the subject of substitute ties the attention which its increasing importance seems to warrant.

Court Decision Improves Iowa Situation

IOWA electric railways in the absence of a state utilities commission have had a hard row to hoe. Things looked more gloomy than ever when in the Ottumwa case, in July, 1919, the State Supreme Court upheld the appealed decision of the Circuit Court that the contract provision as to rate of fare was legal and binding, but it left one ray of hope by stating that it would submit to a rehearing of the case. The Ottumwa company promptly petitioned for such rehearing and on Aug. 10, 1920, the court reversed its previous view and declared that portion of the franchise calling for a 5-cent fare to be invalid for the reason that the law does not give cities the power and authority to contract with street railways for a specified rate of fare.

Undoubtedly this favorable decision will be of far-reaching effect in all present and future fare controversies in Iowa, final determination of several cases having already been delayed pending the outcome of this Ottumwa case. We are glad to note this decision, for, like the companies of every other state, those of Iowa were not endowed with the foresight to realize that a fixed-fare franchise of immense present value might some day become a serious liability. And since this inequity of a fixed fare in a long-term contract has been established in most other states, it would have been unfortunate indeed for the railways of Iowa, almost alone, to be left longer in the predicament which the original Supreme Court decision caused. Perhaps the effect of this decision may even reach Florida, where, for example in Jacksonville, the only recourse from the referendum of the people disapproving an increase in fare is to appeal to the courts for similar adjudication of the fixed-fare clause of the franchise.

Is It Amortization at Last?

BY RECENT decision of the Illinois Public Utility Commission the Chicago surface traction system inaugurated July 1 a plan for using the current renewal fund accruals differing somewhat from the stipulation of the ordinance requiring 8 per cent of the gross receipts to be deposited monthly in the renewal and depreciation fund, bearing 3 per cent interest. This decision was reviewed on page 337 of this paper dated Aug. 14.

This decision seems to mark an important step in the actuarial treatment of this very involved subject, and it is to be noted particularly that it will likely inaugurate the beginning of amortization in the case of the Chicago surface lines out of direct revenue, which has long been recognized as the chief omission of the 1907 ordinance as viewed in the light of present accounting knowledge.

From the commission's findings it appears that a $10,000,000 fund (already on deposit) is big enough to constitute a safe "nest egg," earning only 3 per cent in a 7 per cent or 8 per cent market; that new equipment purchased direct from the renewal reserves will not increase the official capital account computed according to the formula of the 1907 ordinance, unless and until paid back; that this accounting expedient is authorized as an emergency measure, in view of the present money stringency; that a preceding temporary order establishing the renewal reserve as 8 per cent on the gross receipts, computed on a 5-cent fare basis, has been changed to 8 per cent of the total present recipts, in recognition of prevailing and continuing high cost of renewal material, and that the rate of expenditures for new equipment is automatically limited by the amount of unexpended balance remaining from the 8 per cent after normal renewals have been taken care of.

The accounting problem involved will be recognized as a simple expedient for anticipating the normal renewals of rolling stock, in order to avoid the necessity of buying new capital at excessive rates, and this seems to be eminently justifiable. Furthermore, it permits the property to turn over its current resources promptly, without banking or underwriting fee, by employing a liquid fund. To continue the present practice of placing all renewal reserve in the renewal and depreciation fund would be simply to increase by gradual steps a fund earning only 3 per cent interest. In other words, the whole process resolves itself into the familiar plan of "putting money back into the property."

As the "special equipment fund" authorized is directly under the eye of the commission and as it is the intent to expend the entire allotment on either normal renewals or equipment, there can be no criticism of abstracting part of the renewal and depreciation fund in contravention of the specific mandate of the contract ordinance, for there will be no balance left. Thus so long as the commission retains specific jurisdiction the situation is in safe hands.

Amortization has in late years been recognized as a fundamental necessity in securing ultimate stability in

capital enterprises, subject to the unalterable law of decretion through wear, use and other causes. It was pre-eminently recognized by the courts in the Kansas City ordinance, and the precedent has been followed in other cases. It makes little difference how amortization is brought about. The Chicago Traction Subway Commission in its 1916 report definitely recommended the use of the $25,000,000 traction fund for the building of initial subways, the same to be uncapitalized, thus definitely recognizing the amortization principle in a commendable way. It seems idle to discuss arguments against such a plan, as there seems to be no other feasible plan that will tend to bring about a parity between property and capital account at the time when a resettlement will become the great public issue as in Chicago, and also the only plan which will equalize in the least harmful way the respective responsibilities of investor, operator and patron.

If, therefore, the action of the commission has rightly been construed as embodying this forward-looking expedient it must be regarded as eminently sound and just.

What Is Power Factor?

THIS question has been asked thousands of times from engine room to president. It has been answered unsatisfactorily as many times. Those of our readers who noted our emphasis of the importance of this little factor in our editorial columns of July 24 will think us facetious when we add, "There ain't no such animal!" Such is the bald truth, however. It is a case like the story of the blind man and the elephant, "They are both right." Neither side has grasped the entire perspective of the problem that is at hand.

Committees of our electrical societies have wrestled with the definition of power factor, particularly for a polyphase circuit, for years. At the recent convention of the A. I. E. E. at White Sulphur Springs eight very able papers by some of our best engineers were presented, setting forth both the practical and theoretical viewpoints. Yet the committee was continued and the problem is as yet unsolved.

We can measure kilowatt-hours of energy very accurately and charges are made accordingly for the energy used. Why bother, then, about power factor? Simply because the lower the power factor the greater the investment required to produce that energy, the greater the losses in its generation and transmission and the less the available capacity of the plant for delivering that energy. Hence the greater the costs *per kilowatt-hour*. Thus it touches the pocketbook and we must all "sit up and take notice."

Fortunately for the balanced three-phase loads usually generated or contracted for by the electric railways there is little question regarding definition and standardization of power factor. The difficulty arises only when the currents and voltages in the different phases are unbalanced or out of phase by different angles. That these conditions are serious with the present usage of the term "power factor" is very clearly and practically pointed out by Phillip Torchio in his paper presented at the annual convention of the A. I. E. E. *i.e.*, with different unbalanced three-phase loads of power factors varying from 100 to 50 per cent a delivered load of 1,000 kw. may require capacity of equipment ranging from 1,000 kva. to 2,175 kva., and with single-phase loads the variation may extend from 1,740 to 3,000 kva. All of these loads would be paid for upon a basis ranging from 1,000 kw. at 100 per cent power factor to 2,000 kva. at 50 per cent power factor with the present definition of power factor in common use. In cases of single-phase contracts, combined three-phase and single-phase loads or those polyphase loads which are unbalanced with respect to voltage, current or phase relations within one phase, the papers in question should be carefully studied and care exercised that the proper standards are determined. Evidently in such cases we must either change our definition of power factor or introduce an additional element into our rates involving a properly defined "unbalance factor."

Manufacturers of electrical equipment, central stations and consumers would be affected differently by the various definitions proposed. The situation was therefore very well stated by Prof. V. Karapetoff of Cornell University, who told the following parable at the convention:

> In a certain country, at a certain stage of its development, the circle used to be the only curve known, and any objects that could not be made square or rectangular were made of circular cross-section. It came to pass, however, that in the course of industrial development the advantages of a flattened circle or ellipse were gradually realized.
>
> At first the forms of the ellipse used departed but slightly from the circle, and every one was speaking about "the mean radius of the ellipse," without thinking of any exact definition of the term. By and by more oblong forms of the ellipse began to be used, and with them came ambiguities, controversies and even lawsuits, until it became necessary to appoint a joint committee for the definition of the "mean radius of the ellipse." The committee began its activities by holding a public hearing to consider the interests of those concerned. First came the representatives of makers of canned meats, who stated that the public preferred elliptical boxes of the same height and contents as the former round boxes. So these representatives wanted the mean radius of the ellipse defined as that of a circle of the same area. Next came the makers of labels to go around the sides of the same boxes. They complained that they could not figure out correctly the length of the paper strip for the new elliptical boxes and they wanted the mean radius of the ellipse defined as that of a circle of the same circumference and not of the same area. Finally came the representatives of elliptical pie makers, who wanted two separate definitions for the mean radius of the ellipse. According to them, for selling purposes the largest radius of an elliptical pie should be defined as its "equivalent mean arithmetical radius," irrespective of the other dimension. For purposes of taxation the shortest radius should be used and defined as the "equitable mean geometric radius."
>
> The committee was in great difficulty to decide among these proposals, when a shabby looking, underpaid college professor appeared and bashfully ventured the opinion that the thing really needed was not a fictitious definition of a mean radius of the ellipse, but a careful study of the actual properties of the ellipse. Then, he continued, the area as well as the circumference of the ellipse could be expressed in terms of its dimensions, and each industry could be provided with the needed data. Besides, such an investigation would open the way to further progress in the arts.

Although this parable created considerable amusement, it served well to direct the attention of those present toward the rational and fundamentally sound viewpoint advocated by the professor. This unique method involves the tangent of the angle between active power and total kilovolt-amperes in place of the cosine of this angle, which has commonly been known as power factor. Since the quantities involved in this new factor are readily measured on meters, the new ratio should have careful study as a possible factor in rates involving unbalanced loads. It may be found in the discussion of the papers on power factor in forthcoming issues of the journal of the A. I. E. E.

Safety Car Operation

Educational and Practical Methods Which Have Been Developed by the Kansas City Railways, Together with Complete Operating Rules for Safety Cars, Ninety-five of Which Are Now Being Operated by This Company

By

HENRY S. DAY
Equipment Engineer Kansas City Railways

AND

J. M. DAPRON
Mechanical Expert Westinghouse Air Brake Company



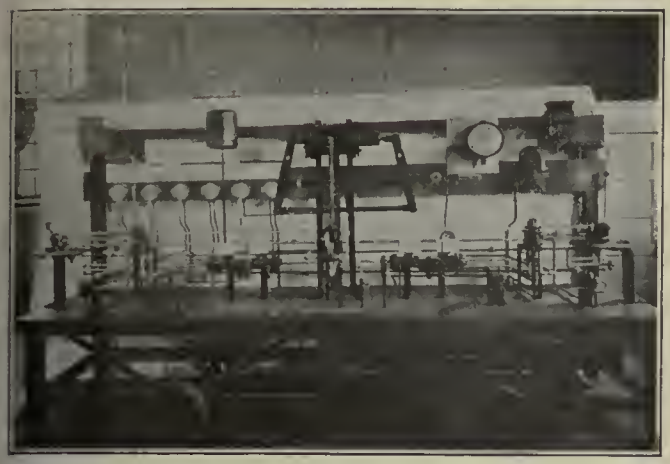
THE INSTRUCTION ROOM IS A BUSY PLACE DURING LUNCH HOUR

THE Kansas City Railways has had thirty safety cars in operation for a year, seventy for the last six months, and it is now operating ninety-five. All but thirty-four of these are operated from one carhouse, which now has a total of 210 cars, the balance being made up of double-truck cars weighing from 35,000 to 48,000 lb. each. All cars are inspected on a mileage basis, and operating costs are worked out on a ton-mile basis, the records for both inspection periods and costs being carefully checked. Recently certain changes were made in the records whereby maintenance costs of safety cars and other types are segregated, so that comparisons can be made. Operating conditions in Kansas City are very severe, due to many and steep grades, heavy passenger loads and fast schedules.

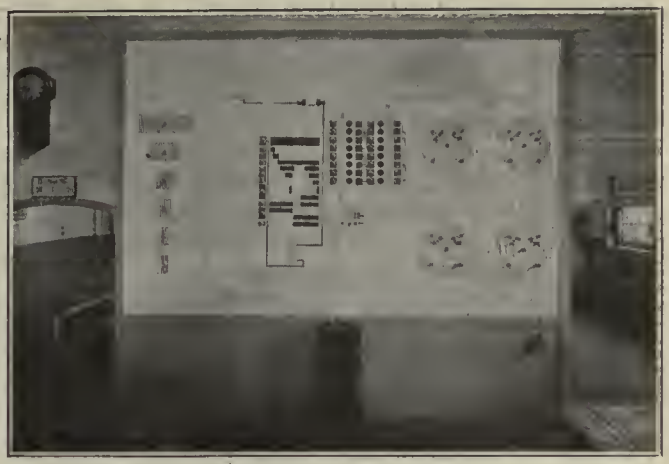
Safety car operation was begun on lines that looped through the heavy riding district, and so far this service has been maintained with few failures. It was, however, quickly discovered that successful operation depended largely on the efficient functioning of the air equipment of the cars, as while no great number of failures were experienced those that did occur were poorly handled by inspectors and repair men, while electrical failures were cleared up with little difficulty. It was apparent from the time that the first car was placed in the service that the personnel at the shops and carhouses was impressed with the idea that the equipment on the car was complicated and that this was particularly true of the air brakes and auxiliary air apparatus. As this company has not a single line on which there are not severe grades, one busy line having to negotiate 13.7 per cent, it was quickly realized that operators, inspectors and repair men must be taught thoroughly to understand the handling and maintenance of the air brake equipment, and with this in mind a definite program was prepared whereby repair men could be taught in detail the functions of every piece of apparatus and when and how it should be inspected and tested. The inspection of the safety car was, of course, taken care of from the outset by the same system as applied to other cars, but experience has shown that the car can, if anything, run on longer inspection periods, but that there is need of special instructions on the air devices.

Test Rack Valuable

The first step taken toward carrying out this program was to build a test rack, comprising a single and double end safety car control equipment, with the addition of sand traps and such air-operating devices as are installed on the safety cars of this railway. The rack was designed in the form of a bench with posts in the back, extending about 4 ft. above the top. These posts were equipped with brake valves, controller handle, foot valves, door and step controllers, emergency valve, rear door unlatching device, register foot valves and register, mounted on brackets secured to the top of the bench and arranged in such a manner that the valves can be taken apart without disturbing the pipe connections. On the three posts at the back of the bench the respective pipe lines are run in a horizontal position. The brake cylinder, compressor switch, fuse, governor, sand reservoir, circuit breakers, register and gages are installed on the extended posts above the bench. The main reservoir and compressors are hung to the underside of the bench top; all pipes are provided with gages



DOUBLE-END SAFETY CAR AIR BRAKE TEST RACK

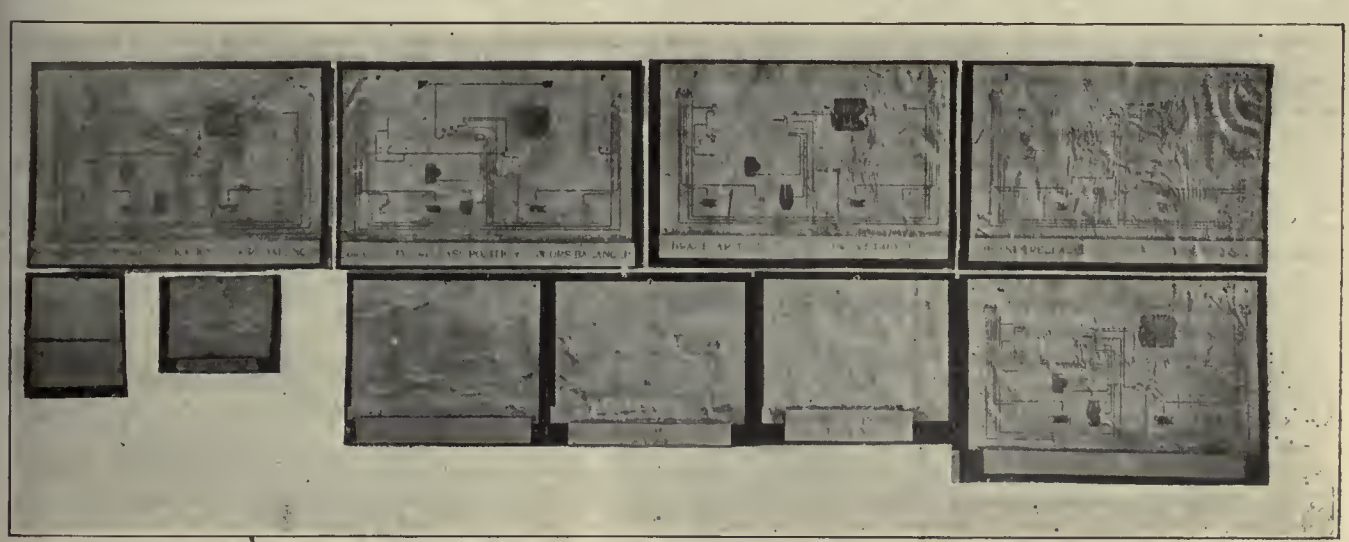


INSTRUCTION CHART FOR "K" CONTROL. COLORED LAMPS SHOW PATH OF CURRENT

and cutout cocks arranged in a manner which provides for the testing of each device. Each pipe line is represented and identified by a color, while the gage connected thereto is provided with a target of the same color with the name of the pipe and volume represented. When it becomes necessary to represent a single end equipment for demonstration the necessary cutout cocks are closed. The rack has also been mounted on wheel carriers which provide for quick and easy removal from one department to another and when not being used in the air brake department for testing the rack can be moved to the instruction room without disturbing any of the pipe connections or equipment. As will be seen from the foregoing, the rack is of unusual design and differs from the ordinary test rack found in most railway shops. It will be noted by referring to the accompanying illustrations that great care was exercised in the arrangement of each piece of apparatus and that by raising the various devices well above the bed of the bench all pipe lines and pipe connections to the base of valves are clearly exposed and easy to trace. The only equipment placed underneath the bench consists of the main reservoir and air compressor connections. The system of pipe connection, mentioned below, was made more easily understood by a color scheme which was used purely for educational purposes in connection with diagrammatic charts. Sets of five diagrammatic charts were secured from the Safety Car Device & Equipment Company, illustrating the apparatus and position of the respective valves for the various conditions as follows: (1) Release position—doors closed; (2) application position—doors closed; (3) application position—front door open; (4) brake valve emergency—doors balanced; (5) controller handle emergency—brake valve in release position, doors balanced.

Colored Charts Aid Instruction

A set of these charts were colored so that each pipe line with valve, ports, etc., corresponded in color with that on the test rack showing the five applications which are made in the operation of safety car control equipment. In the demonstration an application was made on the rack and the operation was illustrated by referring to the chart corresponding to the application made. For example, if the brake valve handle on the rack was placed in application position with the controller handle down, the chart corresponding to this position was used and its colored lines showed that the communicating ports in the brake valves provided air pressure through ports in the rotary, straight air pipe, cavity in the emergency valve, slide valve and into the brake cylinder. This same color showed the straight air pipe pressure with its communication to the combined foot and cutoff valves and that the emergency pipe was being charged while in this position through a feed port in the emergency valve and that the emergency



COLORED CHARTS ARE USED IN CONNECTION WITH TEST RACK

line furnished air pressure to the closing side of the door and step controllers. Pipes and valves with air pressure are colored, while pipes not in use in the application under discussion are shown without color.

MEN COLOR THEIR OWN CHARTS

With a view of awakening interest among the men and as an incentive to study the equipment, repair men and inspectors whose duties required attention to safety cars were supplied with a set of charts, not colored, and were instructed to color them as they became familiar with the system. Master charts hung in the instruction room were always available, and these men were requested to bring their charts to the school of instruction which has been started and is held once a week. At this school the test rack and charts are used and questions answered in the usual manner following similar instructions. The response among the men has been very gratifying, and it is believed that in a short time there will be the necessary number of employees thoroughly instructed and competent to handle this equipment properly.

Thus far no very radical changes have been made in the system on inspection except that a definite leakage test has been put into effect. This test consists of charging up to 63 lb., holding controller handle down with brake valve handle in full release position and compressor switch open. When the gage shows that the air pressure has leaked down to 60 lb. time is taken, and again at 55 lb. and 50 lb. This gives the average rate of leakage per minute. The same method of determining the rate of leakage is employed by next moving the brake valve handle to application position and then releasing the controller handle. After this reading has been secured the brake valve handle is moved to the door-opening position and another reading is taken. The first test will include the main reservoir and accessories, main reservoir pipe, emergency pipe, door-closing side of the door and step controllers and the rear door unlatching device. The second test includes the above-mentioned fixtures with the addition of the straight air pipe and brake cylinder. The third test includes all of the second test with the exception that the door-opening side of the door and step controller is charged. When the average rate of leakage is 2 lb. per minute or over the equipment is gone over with soapsuds and the leaks are repaired until 1½ lb. per minute as a maximum rate of leakage is secured.

During the past winter considerable trouble was experienced from freezing of air equipment. To overcome this trouble the 1 in. pipe between compressor and main reservoir was replaced by a 2 in. pipe. On these cars no further trouble from freezing was experienced.

It may be interesting to other roads operating or contemplating the operation of safety cars to include the operating instructions prepared by the mechanical department of this property and approved and used by the transportation department.

Instructions for the Operation of Safety Cars by the Kansas City Railways

General: In handling the safety car it must be kept in mind at all times that the car is distinctly a different type from the ordinary trolley car; that it has certain limitations, and that these limitations must be favored by the operator. The total weight of the car, without passenger load, is about 15,000 lb. With an unloaded car or a small load there is always a possibility of the wheels sliding and a consequent flattening, unless the operator follows instructions under "Brakes."

A "full" load for a safety car is sixty passengers and this number should not be exceeded. When this number of passengers is reached, the "Car Full" signed should be displayed and no more passengers allowed to board the car. Due to the light construction of the car body and the horsepower of the motors, no attempt should be made to push or pull a car, other than a safety car. One safety car can handle one other disabled safety car, but *no more*. In case the car ahead is of a heavy type and disabled the disabled car will have to be removed by some other means.

Where it is found necessary for the operator to get onto the roof of the car he should never touch the trolley pole when it is against the trolley wire unless he is standing on the running board. Due to the construction of the car it is not possible to completely insulate the roof, and there is always a possibility of receiving a shock sufficiently heavy to cause the operator to let go his hold and perhaps fall from the car. In other words, it is possible to receive a shock if the roof and the trolley pole are touched at the same time by any part of the body. Also the roof is of light construction and not made to support the weight of a man off the running board.

Motors: The safety car is equipped with two motors, which are connected practically the same as the motors on the ordinary two-motor single-truck car. Owing to the horsepower of the motors and the light car body, it is possible to start a car rapidly and to feed up the controller much more rapidly than on the ordinary car without knocking out the circuit breaker or causing harm to the electrical equipment. It is of the greatest importance that the notching up of the controller be done smoothly and without jerking. With heavy loads and on grades the operator must use discretion, and the amount of time required on each resistance point is of course governed by the passenger load.

A safety car, like any other two-motor car, can be stopped by reversing, but the effect on the car and motors is much more severe, and a safety car *must never be reversed* except when the brakes are absolutely inoperative, and this rarely happens. It is a demonstrated fact that a car moving at a rate of 5 miles per hour or more can be stopped by a brake application in a less distance than it can by reversing.

RULES FOR OPERATING THE AIR BRAKE AND SAFETY CAR CONTROL EQUIPMENT

The following rules are intended to cover, in a condensed form, the important instructions to be observed in handling this equipment in service.

Charging: Before starting the air compressor the main reservoir drain cocks should be closed and the cocks in the door-closing pipes opened. All hand brakes should be fully released. The fuse in the compressor circuit must be in place and "alive." The handle on the brake valve should be moved to release running and door-closing positions and the compressor started by closing the snap switch in the compressor circuit. The controller handle in the handle base portion should be held down until the gage hand indicates at least 50 lb. pressure in main reservoirs, and under no circumstances should a car be started with less air pressure in these reservoirs.

Running: The brake valve handle should be kept in release, running and door closing position when not being used for a brake application. The controller handle or foot valve should be held down while the car is running, and in the event of sudden danger the hand or foot should be removed immediately from the respective valves, or the brake valve handle moved quickly to emergency position, at the extreme right, and kept there until the car stops and the danger is past. If the brakes apply while running, due to rupture of the piping, the brake valve handle should be moved to the emergency position at once, to prevent loss of main reservoir pressure. After the car stops the cause of the application should be located and remedied before proceeding.

Service Application: To apply the brakes for an ordinary stop the brake valve handle should be moved to service application position. When the desired brake cylinder pressure, depending on speed, condition of rail, grade and kind of stop desired, has been obtained the brake valve handle should be returned to lap position, where it should remain until it is desired either to release the brakes or to make a heavier application. In the latter case the handle is moved again to service application position, thus further applying the brakes until the desired result is obtained and then returned to the straight air lap position.

The controller handle or combined foot and cutoff valve must be held down until the stop is completed and the brake valve handle moved to service application position or door opening position. While a car is standing the brake valve handle must remain in service application position or door opening position, at which time the pressure on the controller handle or combined foot and cutoff valves, as the case may be, can be released, thus permitting the car operator to attend to any duties incident to the stop. The best possible stop will be made when the brakes are applied hard at the very start and then graduated off as the speed of the car is reduced, so that at the end of the stop little pressure will remain in the brake cylinder, unless on a grade. Since the retarding effect of any given application of the brakes is considerably greater at low than at high speed, a heavy application at low speed will result in an abrupt stop, with perhaps discomfort to the passengers or slid wheels. At high speeds a heavy initial application should be made, in order to obtain the most effective retardation possible when the momentum of the car is greatest. If the brake cylinder pressure is very light at first, and is increased as the speed of the car diminishes, it not only makes a longer stop, but the high cylinder pressure at the end will be liable to produce a rough stop, perhaps slide the wheels and result in loss of time, because of the necessity of waiting until this high cylinder pressure can exhaust before proceeding. With practice these correct methods of stopping can be readily acquired.

Holding Brakes Applied: When the desired brake cylinder pressure has been obtained the brake valve handle should be placed in straight air lap position, where it should remain until it is desired either to make a heavier application or to release the brakes. The brake valve handle should never remain in straight air lap position, except while bringing the car to a stop, and in any case it should not be allowed to remain in this position for a sufficient length of time to permit the brake cylinder leakage to diminish the braking power materially.

Release: To fully release the brakes after any application the brake valve handle is moved to release, running and door closed position. The handle must be left in this position at all times when the brakes are not in use, to keep the brake system charged and ready for operation, and to insure that the brakes will not be applied by leakage. Immediately before moving the brake valve handle to release, running and door closed position, which action usually precedes a movement of the car, the controller handle must be held down.

To graduate or partially release the brakes the brake valve handle is moved to release, running and door closed position for a moment, then back to straight air lap position: this operation may be repeated as often as necessary until the car is brought to rest, with only sufficient pressure retained in the brake cylinders to prevent rolling. During this manipulation of the brake valve handle the controller handle or combined foot and cutoff valve must be held down.

Opening Doors and Steps: When the car stops the brake valve handle



THE COMPANY SUPPLIES THE EQUIPMENT, WHILE EMPLOYEES PAY FOR COFFEE AND SELL IT AT 2½ CENTS PER CUP

should be moved to door opening position for the purpose of opening the doors and lowering the steps on the operating end of the car. After the brake valve handle has been in this position for approximately one second the pressure on the controller handle and combined foot and cutoff valve can be released. While the door and steps remain open the car cannot be moved, as the brakes are fully applied.

Closing Door and Steps: All brake valve handle positions to the left of door opening position are, in addition, door closing positions. Should it be desired to close the doors and raise the steps without releasing the brakes, the handle must be returned to service position. Where it is desired to close the doors and steps and release the brakes at the same time, such as preliminary to a movement of the car, the brake valve handle is returned to release, running and door closing position on the extreme left. Immediately before this last operation of the brake valve handle the controller handle must be held down.

Emergency: Emergency situations may be found to exist either because of conditions outside the car, such as the movement of pedestrians and vehicles, or because of conditions originating within the car, such as inadvertence or inattention on the part of the car operator to his duties. With respect to the class of emergency situations first mentioned above it is assumed that the car operator is alert, in which case should it become imperative to stop in the shortest possible time and distance; to save life or avoid accident, the brake valve handle must be moved quickly, from whatever position it may be in, to emergency position, which is at the extreme right, and left there until the car has stopped and the danger is past. While the brake valve handle is in emergency position it is not necessary to hold down the controller handle or the combined foot and cutoff valve. This movement of the brake valve handle, in addition to providing maximum brake cylinder pressure, provides a supply of air through the emergency valve, for the purpose of sanding rails. Also, by exhausting emergency pipe pressure, air pressure is released from the closing side of the door and step controller, so that the doors and steps on both ends of the car can be easily moved by hand. It is intended that the rear door and step be used as an emergency exit.

Concerning the second class of emergency situations, it should be remembered that the operator is required to either hold the controller handle down by hand or press the combined foot and cutoff valve downward at all times with the car in motion; that is, without the brake applied to such an extent that the application would in itself stop the car. Should the operator, for any reason, unintentionally or otherwise, release the controller handle and combined foot and cutoff valve while the brakes are not applied, as before mentioned, this may properly be termed an emergency situation which calls for emergency action, and the result will be the same as described under "Emergency" as initiated from the brake valve, with the additional feature of opening the motor circuit by actuating the circuit-breaker cylinder.

Release After Emergency: To release the brakes and restore normal conditions after emergency action the brake valve handle is placed in release, running and door closed position and the controller handle held down until 50 lb. pressure is reached in the main reservoir, as indicated by the gage.

Changing Ends: Preliminary to changing ends, the brakes must be fully applied, when the brake valve handle and the controller handle can be removed. This brake application is required to prevent emergency, which would otherwise occur upon removal of the controller handle, and it insures

that the car will stand still during the time required to change ends. If the handles are not replaced in their proper positions within a reasonable time to guard against excessive brake cylinder leakage, emergency action will automatically occur. Upon reaching the end of the car from which it is intended to operate, the brake valve handle should be placed in service application or door open position, as may be required. Before attempting to move the brake valve handle to release, running and door closing position the controller handle must be in place and held down.

Sanding: A feature of great importance in obtaining the most effective operation of any brake is that of properly sanding the track when making the stop, since the maximum retarding force is developed when the adhesion between the wheels and the rail is the highest possible. Whether this be realized or not necessarily depends very largely upon the condition of the rail. Various independent sanding devices have heretofore been used for sanding, but in these cars, by incorporating the sanding device in the brake valve, sand may be applied to the rails with the minimum amount of effort on the part of the motorman and with greater safety and efficiency.

The brake valve is provided with a hinged handle, the downward movement of which operates a poppet valve, through the medium of a bail, and air may thus be admitted from the main reservoir pipe to the sand box for sanding the rail for service operations. This manipulation is possible in any position of the brake valve and without requiring the operator to remove his hand from the handle. To insure that sand will be applied to the rails in all emergency applications of the brake, no matter how initiated, air is admitted from a sanding reservoir (normally kept charged from the main reservoir) to the sand pipe through the medium of the emergency valve when it is placed in emergency position.

Whenever it is desired to sand the rails in making a stop this should be done, if practicable, before the brakes are applied, for the reason that if the brakes are set and the wheels begin to slide the application of sand will not, in all probability, cause them to revolve again, and flat spots may result.

In such event, the best practice is to release the brakes slightly at the moment of applying the sand, after which a much higher brake cylinder pressure can be used without causing wheel sliding. If sand is used the rails should be well and continuously sanded until the stop is made or the brakes released.

Circuit Breakers: On such occasions as the circuit-breaker cylinders are called into action, thereby cutting off the current to the motors, it is necessary to turn the controller handle to power-off position before cutting in the power again through the circuit breakers.

Correct Brake Operation: To gain time in the use of power for propelling the car the brake application should be adapted to the speed of the car—for example: At a high rate of speed a full brake cylinder application should be made and graduated off by partial release as the car is coming to a stop. This is accomplished by moving the brake valve handle from service to lap position and then quickly to release position and back to lap. During the stop the point at which these graduations should be begun and the amount of the graduations will be readily acquired through experience. The initial application should be heavy enough and made at such a distance from the stopping point that the car will stop before reaching the stopping point, unless the graduations are made. When the actual stop is made there should be just sufficient brake cylinder pressure to insure that the car will remain in a standing position.

It should be remembered that in making these graduated releases, if a mistake in judgment has been made and the car is not likely to stop until it is past the stopping point, the cylinder pressure should be increased by making a reapplication. With a small amount of practice the required degree of skill in making correct stops can be very readily obtained. The condition of the rail is to be considered at all times when making brake applications, so as to avoid wheel sliding, which greatly lengthens stops and may cause flat stops.

Hogging the Load

AN INTERURBAN railroad in the middle West had considerable trouble with a few of its cars, in that some of the motor's armatures had to be changed quite frequently on account of insulation failures resulting in a breakdown to ground. When this occurred a new or repaired armature would be put in the frame and the car replaced in service, with the result that after making a comparatively low mileage the car was again turned in for trouble, which was found to be the motor with the replaced armature. In repairing these defective armatures it was observed that in all cases the insulation on windings was badly roasted, indicating overheating. As there was nothing found wrong with the method of winding and connecting these armatures and as the fact was that several different armatures had failed in the same field it was suggested to check carefully the winding of the field.

A temporary circuit was arranged in the repair barn and current passed through the field coils connected in series. By checking the polarity of the coils with a small compass needle it was discovered that one of the fieldcoils was reversed. This was remedied and a new armature placed in the frame. After this had been done no further trouble developed. The other cars afflicted with the same ailment were given similar treatment, which cured the trouble.

The following explanation is given as the source of this equipment ailment. Several months prior to this trouble, on account of snow and water conditions, a number of main field coils had failed and were replaced by new ones. On account of the markings on the coil terminals not being clearly understood by the workmen these coils were wrongly placed on the poles. Under these conditions the windings on this motor produced a weaker magnetic field, resulting in its armature running at a higher speed. When this motor was put on the car it tended to "hog the load," resulting in an increased current that overheated the windings, roasted the insulation and finally caused it to break down and cause a ground or short.

Troubles with reversed polarity of fields and wrong connection of field coils with additional methods of testing and locating such troubles were described in the ELECTRIC RAILWAY JOURNAL issues of May 17, 1919, and June 21, 1919. Some shops have reported difficulty in locating reversed polarity by a compass, as the polarity of the compass needle itself is easily reversed if care is not used to keep the magnetizing current used through the fields as small as possible. The other methods referred to use special shop made equipment which is easily constructed.

F. W. Mitchell, supervisor of safety and examination of the New York, New Haven & Hartford Railroad, reports through the *National Safety News* a reduction of 48 per cent in number of employees killed during 1919 as compared with the previous year, with a reduction of 16 per cent in number injured. There has been a heavy reduction in number of accidents since the safety department was organized.

Bonding in Special Locations

Cross Bonding and Special Connections to Structures, Bridges and Poles Constitute a Class of Bonding Universally Used and One Requiring Care in Installation

BY G. H. McKELWAY
Engineer of Distribution Brooklyn Rapid Transit Company

WHILE in most cases the bonding of the joints between the abutting ends of rails comprises by far the greatest amount of work that the bonders of a railway company are called upon to do, yet there are several other kinds of bonds to be applied on practically all roads, except the very smallest.

These bonds are for cross bonding between the rails of the track or between tracks and supplementary copper-returns run in multiple with the track rails, for bonding cross pieces of special trackwork, special connections between the track rails in carhouses, shops or yards, the connection of track rails to elevated structures or bridges, the crossing of streams and the attachment of ground wires leading from the negative buses of power or sub-stations to the tracks or other ground returns in streets or rights-of-way.

The most common of these special forms of bonding is cross bonding the rails of the tracks together. There is no standard distance apart for such cross bonds and the answers to questions which were sent to more than forty railroads by the United States Bureau of Standards regarding such distances proved that the lengths of track between the cross bonds varied from 100 ft. to 3,000 ft., the usual distance being every 500 ft. As a matter of fact, on a single-track line cross bonds should not be needed if both rails of the track are well bonded and could be kept in that condition, and their use is merely the confession of the inability of the company to keep its bonding up to 100 per cent efficiency. With perfect bonding and only a single track the current naturally would divide equally between the two rails so that there would be no need for cross bonds. Where there are two or more tracks, however, they would be needed, as it is unlikely that the loads on the various tracks would be equal and they must therefore be equalized through the cross bonds.

Not only is there no standard distance apart for the cross bonds to be installed but, when they are installed there is no standard size of wire used, although the most common size for cross-bonds as well as for rail bonds, is No. 0000. In most cases the cross bonds are merely bonds similar to those used at the joints, with the exception that the length of strand between the terminals is much longer, the additional length being required to reach across from one rail to the next. As with all other long bonds that are more or less exposed, there is always considerable danger of their being stolen, even where they are buried in the ground, unless the track is in paved streets where the bonds cannot be disturbed after they are installed. To prevent their theft, where they are installed in open track, they are sometimes run between the ties and covered with dirt, and in addition to that pieces of tin or short pieces of wood are nailed to the ties to enclose the wires. Such precautions are often of no value, as the tin or wood will be torn off or broken and then the wires stolen. A much surer way, and a more expensive one, is to encase the cross bonds in concrete, and where enough concrete is used the job can be considered a permanent one. On one road where the standard cross bond for a four-track line had been a 500,000 circ.-mil wire, so much trouble was experienced from theft that the wires were all replaced with old rails connected to the track rails above with short bonds compressed into both the cross-bonding rail and each of the rails above it.

SUPPLEMENTARY WIRES NO LONGER COMMON

A practice much more common in the earlier days of street railway construction than now was to run supplementary copper, consisting of a wire or wires, in multiple with the rails. These supplementary wires were sometimes run on the arms of the trolley poles with the positive feeders, but more often were buried in the earth between or alongside the tracks.

When the negative wires are carried on the poles taps have to be run down to the rails every few hundred feet, and this not only requires additional wire to make these taps but there is danger of the portion running up the pole being stolen unless it is well protected by being encased in either pipe or molding of some kind. Merely fastening the wire to wooden poles with staples will not answer satisfactorily unless a great many are used in the portion that can be reached from the ground. It is generally sufficient to extend the pipe or molding only 7 or 8 ft. from the ground, but sometimes the thieves will be found willing to climb the pole in order to get the wire and they will even cut down sections of the wire that have been run on the poles.

When wire installed on the poles is stolen the thieves naturally prefer to take the negative wire on account of there being less danger to themselves and less chance of the theft being discovered as soon as would be the case if they removed the positive wire. The writer knows of one case where a mistake was made by some copper thieves who cut down a wire that had previously been used as a ground wire, but which a short time before had been cut over to the positive side. Believing that there was no danger they were careless in their handling of the wire and permitted it to ground on an iron gas lamppost. The resulting fireworks frightened them away, and although they were not caught there was no further attempt to steal copper in that neighborhood.

Where iron or steel trolley poles are used for carrying the feeders it is sometimes the custom to drill a hole in the pole near or below the ground line and bring the tap from the tracks up inside the pole, making another hole near the arm so that the wire can be run out and connected to the supplementary wire. Such holes, and especially those under or just at the ground line, weaken the poles and shorten their lives as they permit the entrance of moisture to a portion which cannot be protected by periodic painting.

Another objection to the use of overhead ground wires is that by having both positive and negative wires close to each other there is more danger to the men working

on them, as there is always the chance of their touching both wires at the same time and also, when there are several wires on the same pole, there is danger of making a mistake and trying to connect wires of opposite polarity.

So long as the pole line parallels the tracks there is but little if any reason why the supplementary wires should be carried overhead unless it is desired to use them as an insulated return. Of course wires buried in the ground are not so well insulated as those carried on poles, but if they are tapped frequently to the uninsulated rails there is no reason for attempting to insulate them. When the negative wires on the poles are part of an insulated return system these conditions do not apply and they cannot then be considered as supplementary wires.

Supplementary wires, except for comparatively short runs near the power or substations, are of very little value, as the current density in them must be kept low if



PIN-EXPANDED TERMINALS FOR HEAVY BOND WIRE

the return drop is to be held at a reasonable figure, and much better results can ordinarily be obtained by spending only a fraction of their cost in maintaining the bonding rather than in installing the additional copper. A pair of well-bonded track rails of only the ordinary weight will have a conductance equal to copper wires of at least 1,500,000 or 2,000,000 circ.mil cross-section, so it is easy to see that unless a great deal of copper is run and at great expense, but little reduction in the return drop can be expected.

It is not, however, considered good practice to rely merely upon rail bonding at points where there is special trackwork. In such places there is liable to be more movement of the track than where it is composed only of long pieces of rail, and that movement is certain to cause the bonding to deteriorate rapidly.

Still another reason for abandoning the use of the ordinary type of bonds at each of the joints is that there are comparatively a large number of such joints in a short length of track, so that the cost both of bonding material and the labor to install the bonds would be high. Again, the special work will not last nearly as long as will the straight track, so that the former may be renewed several times before the latter is worn out. Then, if the special work has been bonded at the joints with short bonds, new bonds will have to be installed in the special work perhaps three or four times as often as in the straight rail, and as there is very little salvage from the old bonds—in fact, unless close watch is kept on the laborers making the track changes there will be none, as the rail bonds will be kept by them and sold to junk dealers instead of being turned back into the storeroom—the cost of bonding will each time be approximately the same as for the first installation.

BONDING OF SPECIAL TRACKWORK

A better way, and the one that is now standard on almost all of the large properties, is to "jump" the special work with long bonds made up from pieces of wire, these cables being attached to the ends of the pieces of straight rail and running to the straight rail on the other side of the special work. These cables can be considered as a permanent investment which ought never to require renewal, the only portions of such bonding that have to be changed, under usual conditions of soil, being bonds of small capacity running from the cables to a few points in the special work to which the bonds are connected so that there will be no large differences of potential between the various pieces of metal making up the track special work. As the heavy cable bonds will keep the potential of the ends of the straight rail on each side of the special work practically the same, all of the special work between those points will be of the same potential except when there is a car on the special work taking current from the positive side of the circuit. To prevent the resistance of the unbonded joints in the special work from causing a large difference of potential between the adjoining pieces when current is flowing from the car into the castings is the reason for bonding some of them to the wires and so insuring that there will be but little drop between any piece of the trackwork and the long pieces of rail in the straight track.

Not only will it be unnecessary to renew the bond wires when the special work is renewed but they can also remain in place even if the rails in the rest of the line are renewed. All that will have to be done will be to disconnect the terminals at the ends of the wire from the rails and then to reconnect them to the new rails when those are laid.

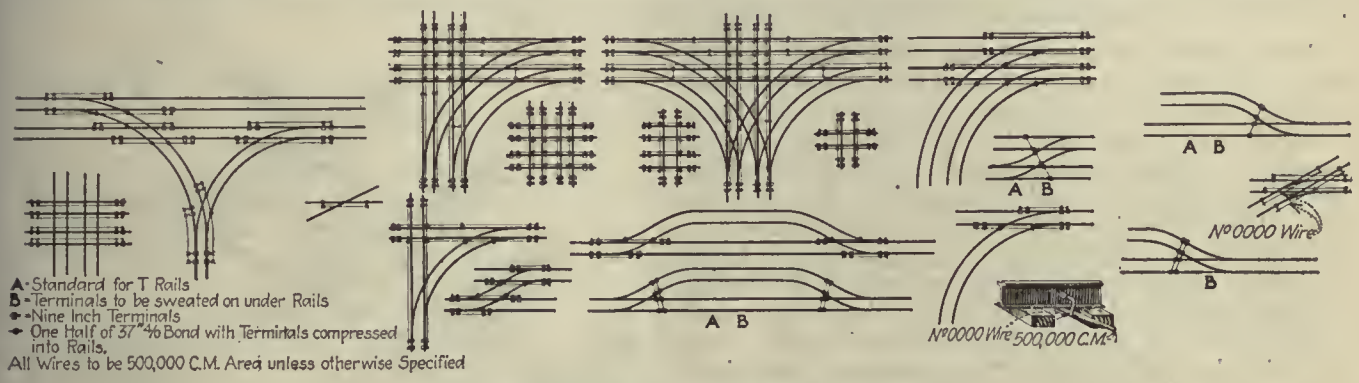
If for any reason the special work is abandoned and taken up the bond wires, too, can be removed and either sold as scrap or, if they are of the right length, used to bond another similar piece of special work somewhere else on the system.

In order that the wires can be removed or changed to conform to a new special work layout, in case the type of layout should be altered, it is best to run the wires over the ties rather than underneath them in all places where the track is installed with a concrete foundation over which paving is placed. For special work layouts in open track it is best to bury the wires and place them under the ties so as to prevent their being stolen, but where the wires are protected by the pavement that arrangement is neither necessary nor desirable, because if it is made when the special work is taken out it will be necessary to break out more of the concrete foundation and then dig down to get wires out. Another reason for keeping the wires above the ties is that in case of any excavation by other companies or contractors under the tracks the wires are not exposed to the employees of the contractor while hidden from those of the railroad company. When bonding is exposed to the sight of the ordinary contractor's laborer

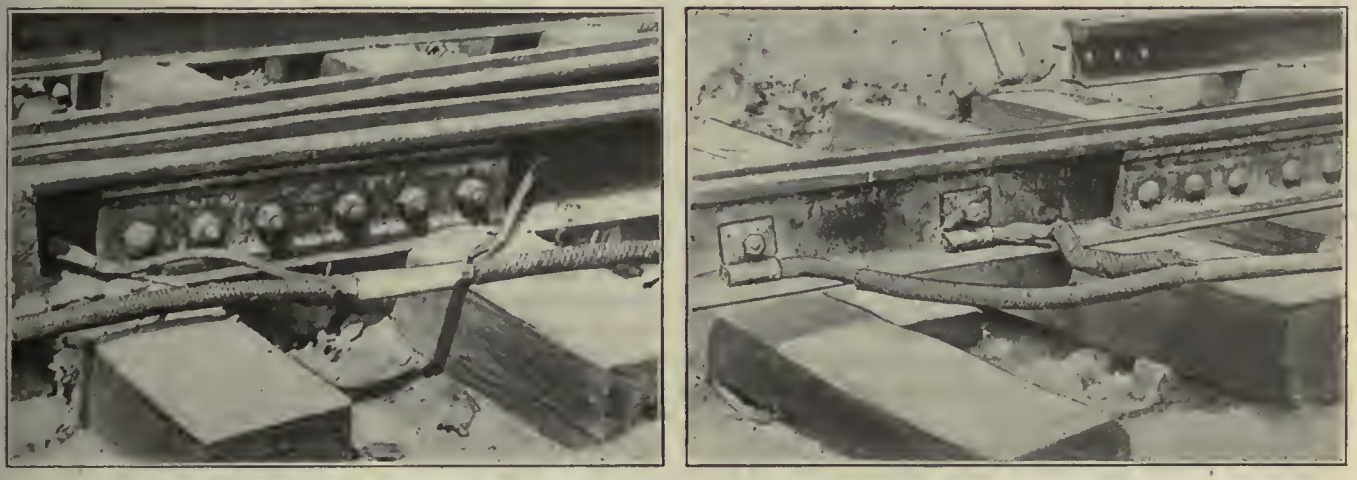
and to no one else, experience shows that the temptation to cut them off and dispose of them at some nearby junk shop is nearly always too strong to resist.

The wire used for such special work bonding may be made up of any wire on hand, insulated or uninsulated. Comparatively short lengths, too short to be advantageously used on pole lines, can be used up in this way instead of being sold as scrap.

Often weatherproof wire is taken down from a pole line after having been in service for many years, and the insulation on it will be found to be in such poor condition as to preclude its use overhead unless it is first reinsulated. At the same time the conductor will be in as good condition as when new, so that for bonding purposes the wire is as good as any other. The rails to which the bonding wires are attached are uninsulated and so are the joint bonds, so that the insulation is not needed at the special work if used nowhere else on the line.



DIAGRAMS OF SPECIAL TRACKWORK BONDING



AT LEFT, CONNECTING RAIL AND BONDING CABLE WITH HALVES OF BONDS. AT RIGHT, BOLTED AND SOLDERED TERMINALS

For attaching the wires to the rails many companies use compressed or pin-expanded terminals, either special terminals supplied by the manufacturers or ends of cable bonds which have been cut in two so that each bond supplies two terminals. Still others weld the bond to the rail, but this requires special equipment and is expensive.

Bolted and Soldered Terminals Favored

The best comparatively cheap method of attachment that has come under the observation of the writer is by means of the use of a bolted and soldered terminal of the type shown in an accompanying illustration. These can be used only on girder rails or high T-rails, as they cover too much surface to be installed on the T-rails with comparatively low webs. There a terminal like those used on switchboards can be applied with better results.

To install the larger terminal a hole is first drilled of the proper size, and then that portion of the rail which will be covered by the terminal is brightened, either with a grinder or by means of chipping away the dull surface with a chisel, using only light hammer blows. Of the two methods of polishing the rail the latter, though requiring more time and labor, will give the better surface, as the solder will adhere better to the roughened surface than to the smooth one. The terminal is tinned and the back next to the rail has grooves cut into it so that the solder will flow down behind the terminal. The rail is heated with a blow torch and the terminal sweated on and drawn up tight to the rail by means of the bolt.

In large carhouses or storage yards and at terminals, there is, at times, so much special work that to bond each piece separately would be a very expensive proceeding and at such points heavy cross bonds bonding all of the tracks together and other leads from these cross bonds or from portions of the trackage in the yard or terminal are run out to the main line tracks beyond the last of the special work.

While it is necessary to use such special construction at some few places, yet whenever possible standard methods of bonding should be adopted for each type of special work and these standards adhered to. Accompanying diagrams show the way in which most of the

standard types of special work can be bonded. In these diagrams, although but a single wire is shown attached to each of the rails, yet it will be noticed that two terminals are used to make this connection. This is just a safety precaution to insure that the circuit will be continuous even if one terminal should by some means become loosened from the rail or the conductor.

In some cities it is the practice to bond across the special work with wires having the same total conductance as that of the rails on each side, but this should not be necessary, as the increased drop across infrequently used pieces of special work should lower the potential of the line by such a negligible amount as to make the difference unnoticeable and there should never be enough current returning through the rails to heat up the wires or connections enough to endanger them.

Bond to Elevated Structure Where Possible

Where there are steel elevated structures running toward the power or substations it is nearly always well to take advantage of the high conductance of the large mass of metal composing them and therefore all lines crossing underneath them should be bonded to them. One of the illustrations shows a good method of doing this. The connections to both the rails and the column of the elevated structure are usually made with bolted and soldered terminals, although sometimes the method of using halves of bonds with the terminals compressed into the rails, as shown in the drawing, is used. Occasionally the leads to the metal structure have been continued in the pipes up the columns to the girders, but this is unnecessary if the columns and girders are bonded together and it costs much less to install the bonds between them than to extend the wires to the top of the columns.

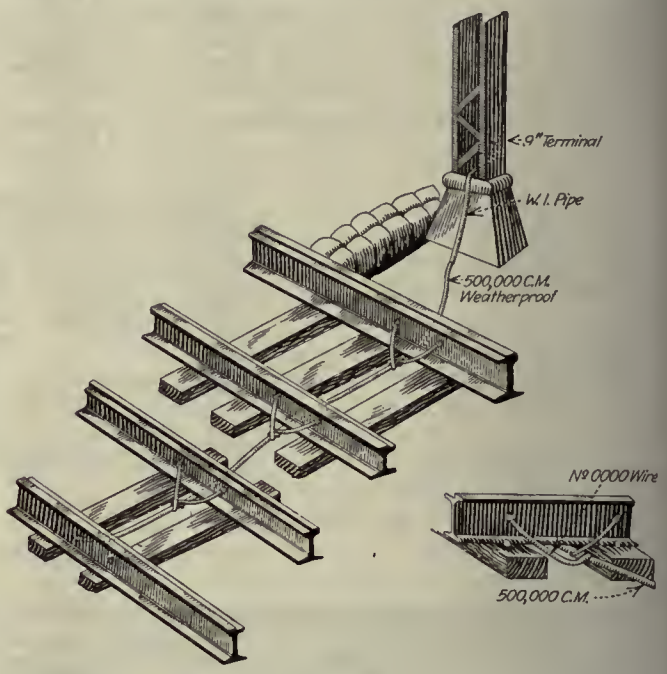
Sometimes the pipes are run up the columns to a height of 8 or 10 ft. above the ground line and the wires connected to the column there, the pipes protecting the wires from injury or theft. However, the method shown in the drawing, where the wires are attached near the foot of the column but a little above the ground line, is cheaper and perfectly satisfactory if the wire and terminals are protected. Where latticed or similar types of columns are used it is best to place the terminals inside of the column to protect them and then to seal them there by filling up the lower portion of the column with concrete.

Another condition which requires special bonding is where the tracks or other returns cross a river or other navigable body of water on a bridge the height of which is not great enough to permit of vessels passing underneath and where a draw must be opened to allow them to go through.

This condition may be treated in either one of two ways, depending upon whether the tracks across the river from the source of power are completely separated from the station, or whether, through cross bonding with other tracks, there is another path or other paths by which the current may return to the negative bus. In the latter case the opening of the draw, although it may increase the return drop a little, but only for a short time, will not interfere with the service or produce any situation which may be dangerous to any pipes or cables on account of electrolysis. All that is necessary then is so to arrange the bonding that as soon as the draw is closed the return circuit will also be closed.

This can generally be done in a satisfactory manner by installing on the draw spring contacts which will touch each other when the draw is closed, these contacts coming together with a rubbing motion so as to insure clean surfaces when they touch.

For rolling-lift bridges there is no difficulty in making such contacts, which, of course, should be bonded to all of the rails on the bridge. Nor is there any difficulty in the case of swing bridges if the two arms of the draw are both of the same length. Where one arm is a few inches longer than the other, as sometimes happens, the making up of spring contacts that will work satisfac-



CONNECTING SURFACE TRACKS TO STEEL COLUMN

torily is almost an impossibility if the bridge is handled as such bridges generally are.

If the bridge is swung open to allow a vessel to pass through and then swung back in the opposite direction to close the draw, well and good; the contacts will touch properly and there will be no trouble. But time can be saved and the draw closed more quickly if the direction of movement of the draw is not reversed and instead if it is swung in a complete semi-circle, following the boat through. This brings the short arm of the bridge on the side where the long one had previously been and opens a gap there unless the spring on that side is so abnormally long as to make almost certain that it will be broken when the long arm shall swing around again.

Where contacts on the bridge cannot be used it is necessary to install conductors of some sort all of the way across the channel, either overhead on extra long poles, something which is seldom done, or under water by sinking the wires or other conductors to the bottom of the stream. It is not necessary that regular submarine cables be used in this service, for bare copper conductors will be almost as satisfactory, although they will deteriorate more quickly, especially if the water is at all salt. In such locations the electrolytic action of the current leaving the wire at the surface of the water can very easily be noticed, and after the wire has been in service for a time the copper strands will show signs of having been eaten away at the point where the current leaves them. Where there is much of a rise and fall to the tide this point of weakness may be spread

over a distance of several feet, so that the destruction of the wire will take place much more slowly than when the corrosion is confined to a smaller area.

Except in very deep waters it is well to make sure that the wires will sink well into the mud at the bottom, either by their own weight or by being put into position by divers. If this is not done there is danger of the wires being carried away by either the hulls or anchors of passing boats. The writer knows of one case where, to protect the return circuit and insure that the conductors in the stream would not be destroyed by passing boats, electrolysis or thieves, they were made of a number of old rails cast welded end to end and sunk in the stream. They were welded together on the shore and drawn into the water by means of a flat car crossing the bridge, their weight causing them to bend at the ends enough for the center to rest on the bottom of the creek, while the ends projected above the water on the banks and were there connected to the track rails by means of short pieces of wire buried in the roadbed.

Principles to Be Followed in Tie Plate Design

Tie Plates Used Under Rails Reduce the Fiber Stresses in the Ties—When Plates Are Purchased Under Specifications the Cost of Inspection Is Small

BY HOWARD H. GEORGE
Assistant Engineer Public Service Railway of New Jersey

THE question of tie-plate design and its effect on the tie is one of the important problems that confronts the track maintenance engineer. It has received a great deal of attention and study through the efforts of the various committees of the American Railway Engineering Association, under whose direction a number of tests and experiments have been made.

The committee that was responsible for the development of the standard specifications of the A.R.E.A. evolved, among others, the following principles that should be followed in the design of tie-plates which are equally applicable to electric railway practice. (See Proceedings, Vol. 14, p. 93):

The plates shall not be less than six inches in width and as much wider as is consistent with the class of ties on which they are to be used.

The length of the plates shall not be less than the safe bearing area of the ties divided by the width of the plate, and, when made for screw spikes, shall be so shaped as to provide proper support for the screw spike.

The thickness of the plate shall be properly proportioned to its length.

The distance from the edge of the rail base to the end of the tie-plate on the outer side must be uniform, and in excess of the projection inside of the rail base.

Where treated ties are used or where the plates are for screw spikes, a flat bottom plate is preferable. Where ribs of any kind are used on base of plate, these shall be few in number.

The punching must correspond to the slotting in the splice bars and, where advisable, may be so arranged that the plates may be used at joints. Spike holes may be punched for varying widths of rail base where the slotting will permit such punching without the holes interfering with each other and when the plate is of such design that the additional holes will not impair its strength.

There has been much discussion among steam railroad engineers as to the minimum thickness of plates required at the edge of the rail base. Some have argued for a minimum of $\frac{5}{8}$ in. while others have maintained that a thickness of $\frac{1}{2}$ in. gives more satisfactory results. Of course it is entirely a matter of respective loading and the kind of timber in the tie on which the plate is used. In the case of electric railways it is not felt that the load requirements would ever justify specifying a thickness in excess of $\frac{1}{2}$ in. and a thickness of $\frac{7}{16}$ in. will generally be found to be ample, regardless of the kind of timber in the tie.

Some railroads are using an inclined tie-plate, the maximum thickness of which is $\frac{3}{4}$ in. and the minimum less than $\frac{3}{8}$ in. In addition the plate is cambered lengthwise of the rail, this giving a line contact instead of a surface contact between the rail base and the tie-plate, which line of contact is always at some point between the two edges as the rail flexes under moving loads. It eliminates the concentration of the load on the near and far edges of the tie plate as the loads approach and recede. One large railroad has adopted a tie-plate of this design as its standard. The inclination tilts the rail inwards and is designed to make the resultant force due to a wheel load on the rail and the wedging action due to the coning of the wheels, which are at right angles to each other, coincide with the center of the rail. Some few engineers have at various times argued to eliminate coning, but they evidently were not very well informed as to the reason for its use. As a matter of fact, it is absolutely necessary for the safe operation of a railroad. Wheels were first made with flat treads, but they soon tore to pieces the metal strips used for rails and the wheel flanges as well, so that it early became necessary to introduce coning as a matter of safety. It eliminates excessive rubbing of the flanges against the side of the rail head. When the flange approaches the rail that wheel is turning on a larger diameter than the other wheel on the same axle, and because they are rigidly fixed on the axle the wheels are caused to swerve in the other direction slightly until a corresponding action takes place on the other rail.

Tests have been made at Purdue University to determine the relation of the crushing strength of different ties with and without tie-plates. (See Proceedings A.R.E.A., Vol. II, p. 844). It was found that the fiber stresses per unit of area of the wood under the tie-plate at the elastic limit in the case of the oak tie were less than those under the rail alone, with the exception of one type of tie-plate that was tested. Of course, the total load was greater. This was accounted for by the perceptible springing of the tie-plates, thus producing a non-uniform pressure on the wood under the plates. Therefore, the loads carried with the aid of the tie-plate, while larger, were not increased in the same ratio as the increase of the bearing surface. In the loblolly pines and in the case of one type of tie-plate tested on red-oak ties, no perceptible springing of the tie-plates was observed within the elastic limit of the timber,

the load being increased in practically the same ratio as the surface. These facts must be given careful consideration in designing tie-plates for use with any particular kind of timber. The primary purpose or function of a tie-plate is to protect the tie from mechanical wear, and all other functions should be subordinated to this. Of course, the brace tie-plate also must act as a brace and care must be taken in its design to obtain a good fit and in the specifications to see that the permissible variation in the dimensions shown does not defeat this object. Assuming, however, that the tie-plate will be of sufficient area properly to distribute the loads imposed, and that it is of sufficient thickness to prevent buckling, it is necessary that the movement between the plate and the tie be reduced to a minimum or eliminated if possible. Otherwise, due to impact, the force of the blow delivered soon crushes the tie and renders the tie-plate ineffective, the crushed wood fibers permitting the retention of moisture and hastening decay. Also care should be taken to see that there is no chance for lateral movement of the rail across the plate and that the distance between the inside faces of the spike holes is not greater than the width of the rail base. Excessive rail movement causes excessive wear on the spike itself and should be prevented as far as possible.

It is recognized that it is the best practice to require that all holes be punched from the top of the plate. This insures a smooth surface for the rail bearing. However, there may be special cases where holes will have to be punched from the bottom, where it is not practical to punch from the top.

Probably no other track fixture deteriorates so rapidly from rust as the tie-plate. Many engineers favor coating all plates with oil before shipping from the mill to retard this corrosive action as much as possible. However, opinion as to the value of such an oil coating is divided. The New York Central Railroad made some tests a few years ago of some steel plates coated with linseed oil and found that they began to rust within

Steel Tie Plates

1. Material:

The plates shall be made of bessemer or open-hearth steel.

2. Physical Tests and Properties:

The steel in the tie-plates shall conform to the following requirements:

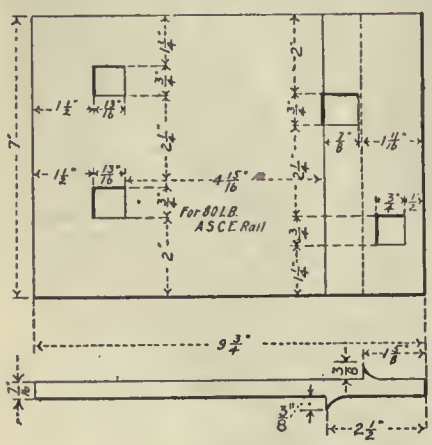
(*a*) Ultimate strength, not less than 55,000 lb. per square inch.

(*b*) Elastic limit, not less than 50 per cent of the ultimate strength.

(*c*) Elongation, not less than 20 per cent in two inches.

(*d*) Reduction of area, not less than 40 per cent.

(*e*) Plates shall bend cold for 90 deg. without showing any sign of fracture.



STANDARD SHOULDER TIE PLATE

A sufficient number of tests will be made to satisfy the railway company's inspector that the material meets the specifications in every respect, and he shall have the privilege of selecting the specimens to be tested.

3. Workmanship and Finish:

Subject to the following allowances, the form and dimensions of the plates shall conform to the drawings submitted to the manufacturer:

(*a*) The length and width of the bearing surfaces of both plain tie-plates for T-rail and brace tie-plates for girder rails shall not vary more than $\frac{1}{8}$ in. from the dimension shown.

(*b*) The thickness of the metal in the plates shall not vary more than $\frac{1}{32}$ in. from the dimensions shown.

(*c*) All variations in length shall be left on the inside end of the plate.

(*d*) In the case of shoulder tie-plates, the distance from the shoulder to the outside end of the plate must be made uniform.

(*e*) In the case of brace tie-plates, the height of the brace above the top of the bearing plates shall not vary more than $\frac{1}{32}$ in. from the dimension shown on the drawing.

(*f*) The spike holes must be punched from the top, clean cut, without burrs, and the plates must not be cracked or bent out of shape in punching the holes.

(*g*) All plates must be stamped on the top side, outside of the base of rail, with the section and weight of rail.

(*h*) The plates shall be free from burrs and imperfections.

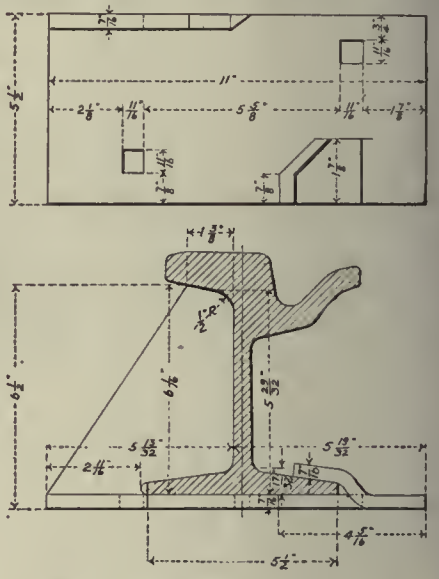
4. Inspection:

When required, the manufacturer shall furnish samples of tie-plates from a preliminary rolling before proceeding with the filling of the order, and shall give sufficient notice in advance of the date when they will be ready for inspection.

The railway company's inspector shall have free entry at all times, while the work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered.

The inspection shall be made at the mill and the manufacturer shall afford the railway company's inspector, free of cost, all reasonable facilities to satisfy himself that the plates are being furnished in accordance with these specifications. The tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

Tests shall be made of samples of the finished product selected by the railway company's inspector from each lot of fifty bundles. Two (2) pieces shall be selected for each test and if both meet the requirements of the specifications the lot will be accepted, but if both fail the lot will be rejected. If one of the test pieces fails a third test piece shall



RAIL BRACE FOR 116-LB. RAIL

be selected from the same lot and tested. If it meets the requirements the lot will be accepted, but if it fails the lot will be rejected.

If, after shipment, any tie-plates are found to be defective, due to material or manufacture, they may be rejected.

5. Shipping:

Tie-plates shall be wired together in bundles, the weight of which is not to exceed 100 lb., and shipped with a uniform number in each bundle.

two or three months when exposed to ordinary weather conditions. Since storage of such fixtures as tie-plates is generally made in the open or under open sheds, they are more or less exposed to the weather and corrosion is apt to be very rapid, especially where they are exposed to salt air. On our own property, it has been the practice to require the manufacturer to coat all tie-plates with red lead before shipping, and this has been found to give excellent results. If not protected in some way, steel tie-plates are very apt to go to pieces very rapidly before they get into the track.

The inspection cost of the plates is very small. It amounts to only about 20 cents per net ton at the present time. The brace tie-plate shown with the accompanying specifications, for example, weighs approximately 10 lb., so that the cost of inspection would only be about one-tenth of a cent each.

Shockless Crossing on Pacific Electric

Special Type of Crossing Placed in Test at Heavy Traffic Center in 1917 Is Giving Good Satisfaction

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

IN AN article in the ELECTRIC RAILWAY JOURNAL for Feb. 21, 1920, I mentioned, in a table of various crossings, that the Pacific Electric Railway had installed a Cobb shockless crossing* for a test. This was installed during the year 1917 and in order to give the crossing as severe a test as possible it was placed at the intersection of Fourth and Main Streets, Los Angeles, which is a heavy traffic center where the narrow-gage Los Angeles Railway's double tracks cross the double-track combination gage jointly operated by the Pacific Electric and Los Angeles Railways. Since installation over 4,000 movements per day have been successfully handled.

This type of crossing is automatic and the mechanical parts are electrically operated. The track intersections, as shown in an accompanying illustration, are composed of movable rails mounted on eccentrics or cams that are keyed to shafting directly under the rails. One set of the rails is in "down" position, while the other is elevated to a level with the corresponding tracks. This makes a continuous rail over the crossing. The detached rails are lowered about 1½ in. to allow the flanges of the car wheels to pass over them without striking. The shafting upon which the cams are mounted is turned by means of a cylinder and piston operated by compressed air. This cylinder is similar to the brake cylinders used in connection with air brake equipment. Compressed air is supplied by an automatically controlled compressor which is installed in the basement of an adjoining building. A conduit line extends underground from the crossing to the air plant. The average monthly consumption for the operation of this plant has been 8 kw.-hr. and the maintenance expense of the crossing has been comparatively small. The illustration shows the manner in which manhole covers may be removed for any attention necessary to the mechanism of the crossing. When cars approach the crossing they pass onto an insulated section of track. Relays are thus energized, which in turn control electrically operated air valves. These air valves supply air to the cylinder for operating the crossing rails. Each approach has a separate set of relays so the crossing is automatically set for the car or train that has the right of way over the crossing. Powerful interlocking devices preclude any possibility of failure, but as an additional safeguard



SHOCKLESS RAILWAY CROSSING WITH ONE MANHOLE COVER REMOVED

cams, shafting, mountings and bearings are made of strong construction so that they will elevate the heaviest locomotive in operation on any road at the present time. The Pacific Electric Railway now operates three-car interurban trains, which consist of some of its heaviest types of equipment, over the crossing daily. The weight of these cars is 107,000 lb.

*Details of the Cobb crossing will be found in the issues of this paper for May 22, 1915, and Oct. 7, 1916.

More Information on Burning Holes in Rails

Tests Made by Great Northern Railway with Burned Holes in Web of Rails Indicate This Practice Is Not Safe

BY JULIUS H. GOOD
Inspecting Engineer Great Northern Railway, St. Paul, Minn.

IN THE issues of the ELECTRIC RAILWAY JOURNAL for May 1 and July 24, 1920, reference was made to the use of burned holes in the web of rails. The Great Northern Railway has carried on some quite extensive experiments in this direction, the results of which may be of interest to electric railway men.

In August, 1919, we started welding frogs and cutting track material on quite an extensive scale with the oxyacetylene flame. A considerable amount of cutting and perforating of rails was done, principally on sidetracks and in yard work. This method proved economical and quite a labor saver. However, during the following winter several rails with perforated holes in the web broke in service. This naturally led to an investigation regarding the safety of this practice, especially where rails were used under high-speed main-line traffic. Instructions were immediately issued limiting the practice to use on side tracks and yard work and some extensive laboratory tests were instituted at the Gary mills, in conjunction with the Illinois Steel Company, to determine the relative safety of drilled and

burned holes in rails. These tests were made while the plant was rolling 3,200 tons of 90-lb. section rail for our company.

For making the tests we cut up two G. N. 9036 rails into 4-ft. lengths and numbered them consecutively from one to twelve inclusive. The odd numbered pieces were drilled with a 1⅛-in. hole through the web at the center and the even numbered pieces had the same size hole burned by the oxyacetylene process in the same location. The first six pieces were tested to destruction in a drop-test machine and the other six pieces were given pressure tests in a Riehle machine in the laboratory. The impact test with the drop-testing machine used a tup of 2,000 lb. with a height of drop of 13 ft. and with 36 in. between centers of supports. Results are given in the order in which they were made:

1. Drilled sample. Broke through a flaw in the base of the rail clear of the hole on the first blow.

2. Sample with burned hole. Broke through the hole at the first blow.

3. Drilled sample took a permanent set of 1.1 in. on the first blow and broke through the hole on the second blow.

4. Sample with burned hole. Broke through the hole in an angular direction on the first blow.

5. Drilled sample. Took a permanent set of 1.1 in. on the first blow, 1.8 in. on the second blow, and then broke square on the third blow.

6. Sample with burned hole. Broke angular through the hole on the first blow.

The results of these tests were not entirely satisfactory, so it was decided to finish the remaining tests by the static method in the Riehle testing machine. so that a unit of measurement could be secured, and therefore a better comparison made. The capacity of this machine is 300,000 lb. Rails were placed in the machine with the same centers as used in the drop tests, that is, 36 in. Tests were made on three samples with drilled holes and three with burned holes. The results are given in tests No. 7 to 12 inclusive.

7. Sample with drill hole stood a load of 162,000 lb., then broke squarely through the hole. The break indicated some segregation in the web.

8. Sample with burned hole stood a load of 117,000 lb., then broke squarely through the hole.

9. Sample with drilled hole stood a load of 189,000 lb., then broke through hole.

10. Sample with burned hole stood 102,000 lb. and then broke irregularly through the hole.

11. Sample with drilled hole stood a load of 117,000 lb. and then broke squarely through the hole.

12. Sample with burned hole stood load of 116,000 lb. and then broke squarely through the hole.

From the above it will be seen that the pieces of rail with drilled holes took an average of 174,000 lb. to break through the section, and the ones with burned holes an average of about 110,000 lb., or a difference of about 64,000 lb. in favor of rails with drilled holes.

Further tests were made by taking 4-ft. pieces of sound section rail with no holes in the web and testing these to destruction in the Riehle machine. These stood an average of 226,400 lb. load and then broke squarely through the section at the center.

Further drop tests were made on a number of rails from six different heats after the regular tests for the inspection had been made. In this special test the height of drop was 17 ft. and the weight of the tup was 2,000 lb. The results of this test are given in the accompanying table.

RESULTS OF DROP TEST
HEIGHT OF DROP 17 FT. WEIGHT OF TUP 2,000 LB.

Heat Number	Ingot No.	No. of Blows	Permt. Set	Remarks
50126	2	1	1.30	Twisted out of shape.
	2	2	2.25	
	..	3	3.00	
	..	4	....	
	23	1	1.30	Broke through flange account of
	..	2	....	slight segregation.
53101	2	1	1.45	Broke through section.
	..	2	2.50	
	..	3	3.30	
	..	4	....	
	..	1	1.45	Broke through section.
	..	2	2.45	
	..	3	3.35	
	..	4	....	
52115	13	1	1.30	Broke through section.
	..	2	2.10	
	..	3	3.05	
	..	4	....	
	23	1	1.50	Broke angular through section.
	..	2	....	
39093	23	1	1.40	Broke through section.
	..	2	2.55	
	..	3	3.40	
	..	4	....	
	2	1	1.45	Broke through section.
	..	2	2.50	
	..	3	3.45	
	..	4	....	
30123	2	1	1.55	Broke through section.
	..	2	2.65	
	..	3	3.80	
	..	4	....	
	13	1	1.60	Broke through section.
	..	2	2.70	
	..	3	3.90	
	..	4	....	
48100	13	1	1.60	Broke through section.
	..	2	2.70	
	..	3	3.55	
	..	4	4.10	
	..	5	....	
	23	1	1.55	Twisted out of shape—head and
	..	2	2.65	web broke.
	..	3	3.65	
	..	4	4.10	
	..	5	....	

Our conclusion from these tests was that the practice of burning holes in the web of rails is unsafe, since the rails were weakened more than with drilled holes, and that the use of this method should be limited to yards and sidings.

Civil Service Vacancies

THE Civil Service Commission announces an examination on Sept. 22 to fill a vacancy as purchase agent at the Watertown Arsenal, Mass., at $2,400 per year and other vacancies requiring similar qualifications. After six months' satisfactory service appointees may receive a $20 per month increase. The highest eligibles nearest the vicinity at which the appointee is to be employed will be certified. All citizens over twenty-one are eligible to qualify.

Applicants must have had at least two years' experience as purchasing agent or assistant in the buying of machine, electrical, foundry, woodworking and forge shop supplies.

On Sept. 28 examinations will be held to fill vacancies in the Bureau of Public Roads at an entrance salary of $1,500 and grade of junior civil engineer. No formal examination will be held, but competitors will be rated on experience, training, education and physical ability.

Applicants should apply for Form 1,312 to the Civil Service Commission, Washington, D. C.

Carbon Brush Testing

The Several Materials Which Enter Into the Composition of Carbon Brushes Are Discussed, Together with Methods Used for Testing Brush Quality

BY JOHN S. DEAN
Railway Motor Engineering Department Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

BEFORE going into the details of testing carbon brushes it seems logical that some general information regarding the raw materials, various types, method of manufacturing and general characteristics of brushes be reviewed in order to lay a broad, well-grounded foundation for a more intelligent understanding of this subject. The materials used consist of carbon and pitch. Carbon is a non-metallic element found in both crystalline and amorphous (non-crystalline) forms. Amorphous carbon may be obtained in the form of coke or lampblack. Natural graphite is carbon in crystalline form which is mined in many localities, and artificial graphite is obtained by heating amorphous carbon, such as coke, in an electric furnace to change its structure to a crystalline state. Pitch, commonly used as a binder, is obtained as a residue in distilling coal tars.

Depending upon their composition, brushes may be divided into seven classes:

1. *Carbon graphite*—Known as the ordinary carbon brush and consisting of amorphous carbon in the form of coke, with a small percentage of graphite and binder.
2. *Graphite carbon*—With either a mixture of a large percentage of artificial graphite, some coke and binder, or with a mixture of a large percentage of natural graphite, some coke and binder.
3. *Electro-graphitic*—Consisting of (1) and (2) graphitized by special electrical treatment.
4. *Graphite*—Made of natural graphite and binder.
5. *Impregnated*—Consisting of carbon graphite brush treated with a lubricating material.
6. *Metal graphite*—Made of a mixture of graphite, powdered metal and binder.
7. *Compound brush*—Consisting of alternate layers of carbon and metal.

The following four types are most suitable for railway work. They are listed in the order of their value with reference to the best all-around results obtained in service: (1) Electro-graphite and (2) graphite carbon, both used with commutators having mica undercut; (3) impregnated, used with commutators where it is impracticable to undercut the mica, and (4) carbon graphite, used with commutators having mica undercut.

TWO COMMON METHODS OF MANUFACTURE

The most common two methods of manufacturing carbon brushes are termed the extruded or squirted method and the molded or machined method. In the former of these the material in the form of pulp is forced through a metal die under pressure and then cut off to the desired length and baked at a high temperature to carbonize the bond and permanently set the material. This method is used in making the cheaper grade of carbons, which do not have the strength to resist the breaking and chipping in service. The "molded or machined" method consists in molding the material into blocks



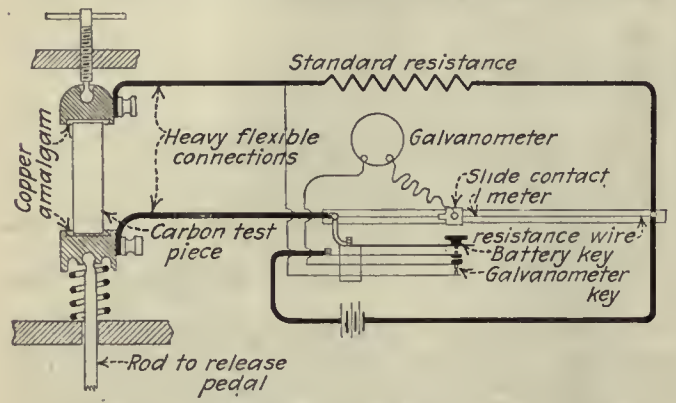




AT TOP, HARDNESS TEST APPARATUS. AT LEFT, STRENGTH TESTING MACHINE. AT RIGHT, CHECKING CARBONS FOR THICKNESS

under heavy pressure and then baking it. Carbons are cut from these blocks and machined to exact size. This method is used in making high-grade carbons and gives a brush of uniform texture and strength that is best suited for railway work.

For railway work it is the most common and considered the best practice to use graphitized unplated



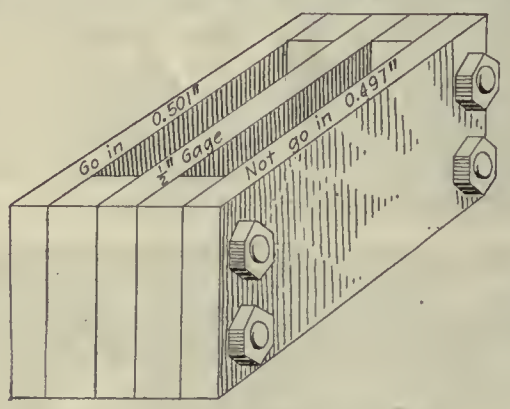
SCHEMATIC DIAGRAM OF SPECIFIC-RESISTANCE TEST APPARATUS

carbons, without shunts or pigtails. In general this type of brush requires the following shop operations to produce the finished carbon from the raw material.

Starting with the raw material, it is crushed, calcined or carbonized, cooled, milled, mixed, again cooled, remilled, molded, packed in furnace, gas baked and electrically baked or graphitized.

The preceding operations produce the unfinished rough carbon blocks, which are then sawed to approximate size, side planed, edge planed, end planed, washed and dried, when the wet process of grinding is used, then cooled, stamped, when not marked during the molding process, chamfered on the corners and finally inspected, which produces the finished brush ready for shipment.

In connection with the manufacture of the many grades of carbon brushes best suited to the various



MAXIMUM AND MINIMUM GAGE BOX

requirements of different service conditions the physical properties of the brush shown in Table I must be considered:

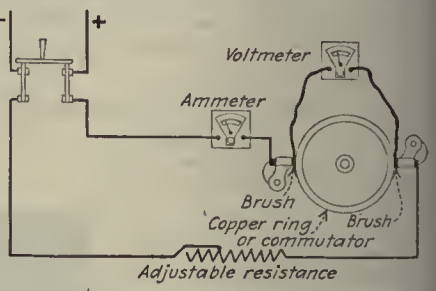
TABLE I—PHYSICAL CHARACTERISTIC OF BRUSHES

Characteristics...	Electrical.....	Specific resistance Contact drop Current-carrying capacity
	Mechanical....	Coefficient of friction Hardness Toughness or strength Abrasivness Density Thermal conductivity Dimensions

One of the most important factors associated with carbon brushes, in which both the consumer and manufacturer are vitally concerned, is the uniformity of the product. This is of the utmost importance from the operator's standpoint. He, after deciding to use a certain grade of carbon, which best meets his operating conditions as determined by a long series of service tests on sample carbons, depends entirely upon the reliability of the manufacturer to continue to supply this grade of carbon with similar characteristics on all future shipments. If for any reason this is not done and some of the carbons in service do not measure up to the samples furnished there is a strong inclination on the part of the operator to discontinue using this brush.

TESTS NECESSARY TO ASSURE UNIFORM PRODUCT

The manufacturer, realizing the above condition, takes all precautions to insure a uniform product in the various grades of carbons manufactured. To accomplish this a careful inspection and test must be made of the raw material as it is received and during the processes of manufacture, as well as of the finished carbons. These tests are made on samples taken from approximately 10 per cent of the materials and finished carbons. They are outlined here to show the user of railway motor carbons to what extent precautions are taken to produce a uniform and reliable carbon brush best suited to meet the requirements of railway operating conditions.



SCHEMATIC DIAGRAM OF CONTACT-DROP APPARATUS

Specific Resistance—The specific resistance of a brush is the electrical resistance of a unit* cube of the material measured between opposite surfaces, expressed in ohms. For measuring this a testing outfit, consisting of the well-known Wheatstone bridge, with the carbon test piece as one leg and the standard resistance as a second leg, and the adjustable divisions of a one-meter resistance wire as the other two legs in the bridge is used. This is shown in an accompanying illustration. The test specimen consists of a ½-in.-square section of carbon 2½ in. long, having, therefore, a resistance ten times that of an inch cube.

The test piece is clamped between two heads, one of them adjustable and the other spring supported. The contact between the carbon and these two heads is reduced to a minimum by the use of copper amalgam paste or copper gauze. A setting of the sliding contacts on the wire is obtained where there is no deflection on the galvanometer when the circuit is closed by pressing the double key. This balance gives a relative resistance of the carbon test piece and the standard resistance unit. By reference to a computed table the resistance can then be obtained without the necessity of calculating the values in each individual case. Another method quite generally used is the voltage-drop method, where a known current is passed through the carbon test piece and the voltage drop across a known length of the carbon is determined. The resistance is then calculated by Ohm's law.

The specific resistance depends on the composition of

*Here taken as 1 in.

the brush and varies from 0.0025 ohm to 0.0001 ohm. The specific resistance of a good grade of electro-graphitic railway motor brush should be about 0.0015 ohm.

Contact Drop—The electrical contact drop of a brush is the sum of the differences in potential between the positive brush and the commutator surface, and the commutator surface and the negative brush. This contact drop is determined by means of special apparatus consisting of a motor-driven flat copper disk and two brushes in contact with the vertical face of the rim. The current passes through the positive brush to the wheel and out at the negative brush. The voltmeter leads are connected one to each brush as near to the brush face as possible. The voltmeter then reads the drop between the brushes.

The size of the test piece will vary in accordance with the general design of the holder. The use of a piece of brush with one square inch cross sectional area will simplify the computation to a considerable extent. Special brushes are required for this test, each of which must have two pigtails, for connection in the ammeter and the voltmeter circuits respectively.



SPECIFIC-RESISTANCE TEST APPARATUS

The test specimens are inserted in the holders and the apparatus is operated for some time with the current flowing until a characteristic surface has been formed. The brush pressure, current density and peripheral speeds are then adjusted and readings are taken, giving the contact drop from brush to brush at the current density brush pressure and peripheral speed used.

The value obtained for the contact drop is determined largely by the material in the brush, the pressure between brush and commutator, the current density and the condition of the surface of the commutator and the brush face, and will vary from 1.25 to 2.75 volts. Accompanying graphs show the variation of contact drop due to change in brush pressure and current density. The contact drop of a good grade of electro-graphitic brush suitable for railway work should be about 2.1 volts.

The current-carrying capacity of a brush is the density of the current that the brush can carry continuously without serious heating, expressed in amperes per square inch of contact surface. Not only the actual load current of the machine is considered in this connection but also the short-circuit current that the brush must carry.

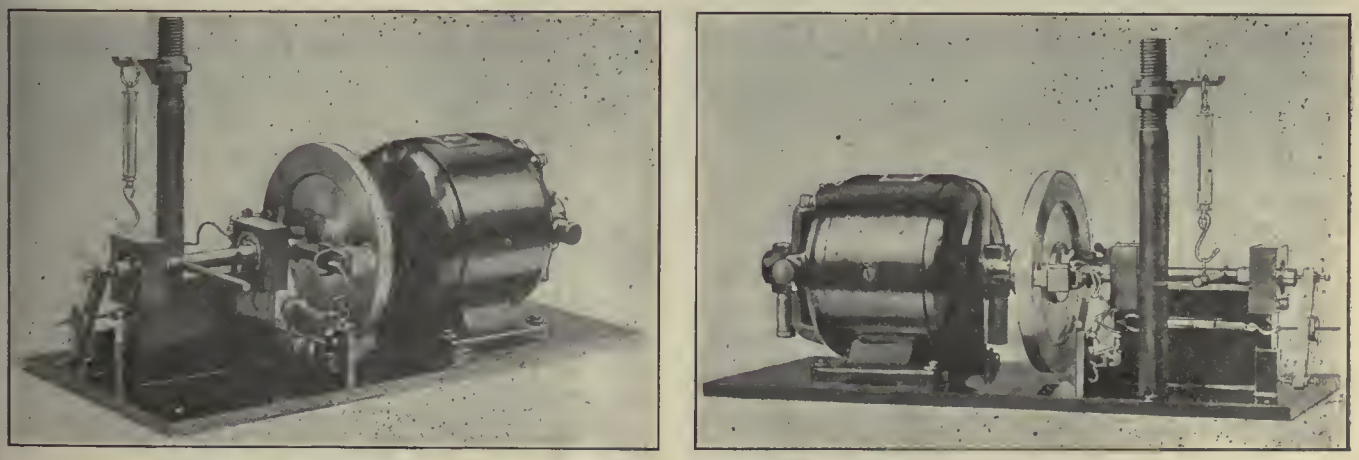
There is no laboratory method of testing a brush for this characteristic. It is dependent on so many factors that a test other than operation under service conditions would have but little meaning. Fundamentally the carrying capacity of a brush is limited by the temperature reached at the contact face and all conditions having influence on this temperature affect the carrying capacity in a given instance. It is the practice of carbon manufacturers to rate brushes in this respect in accordance with what they have observed the brush will carry in service without distress. Ratings given are for continuous service, so that intermittent service such as is encountered on railway motors will permit the use of higher current density than the standard rating of the brush would indicate.

The current-carrying capacity depends on the composition of the brush, specific resistance, contact drop, coefficient of friction, thermal conductivity of the brush itself and the radiation factor of the machine in operation. It will vary from 35 to 70 amp. per square inch, the value for a good grade of electro-graphite brush suitable for railway work being about 50 amp.

Coefficient of Friction—The coefficient of friction of a brush is the ratio of the force preventing rotation (the tangential pull exerted by the commutator upon which the brushes bear) due to friction of the brushes, to the force pressing the brushes (radial pressure applied at the brush face) down upon the commutators, that is, to the total pressure on the brushes.

The machine used for measuring contact drop is also used in measuring the coefficient of friction. In this machine the brushholders are placed on a counterbalanced arm to which is attached a vertically hung spring balance which registers the pull due to the brush friction.

The test specimen used for the contact drop test is utilized for this also, preferably with 1 sq. in. cross sectional area. In this test pigtails are not necessary.



TWO VIEWS OF CONTACT-DROP AND COEFFICIENT-OF-FRICTION TEST APPARATUS

In making the test, brushes are placed in the holder and the motor is operated until the brushes are well seated. It is advantageous to run this test immediately after the contact drop test, as it is then unnecessary to remove the brushes from the holder. With the above apparatus it is possible to hold the current density and brush pressure constant, while data for a curve between coefficient of friction and peripheral speed are made, or by holding the speed constant data for a friction pressure curve may be obtained. From the readings on the springs balance the dragging force is calculated by the law of moments as follows:

$$F = \frac{R \times P}{r}$$

where

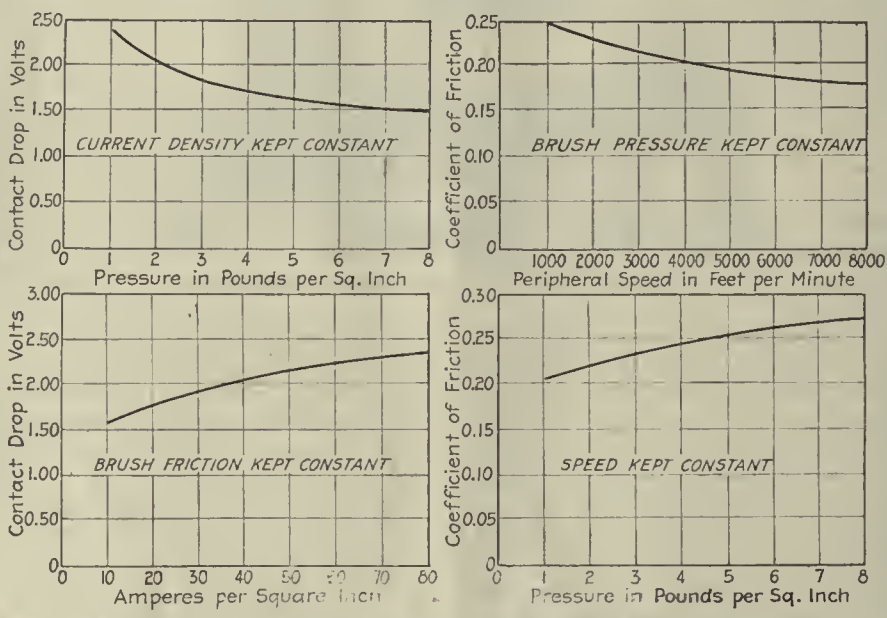
F = dragging force.

R = radius at which dragging pressure on vertical spring balance is measured.

r = radius at which brush makes contact on revolving disk.

P = pull on vertical spring balance.

By using this value of F and the brush pressure on horizontal spring balance $F1$ the coefficient of friction is readily calculated by the same principle. The coefficient of friction is subject to a wide variation due to the peripheral speed of the commutator, brush pressure and composition of the brush, as well as the process of manufacture. This value will vary from a little above zero to 0.75. On account of this wide variation, brush engineers have, for convenience, classified brushes as "high," "medium" and "low," depending on the coefficient of friction. Accompanying graphs show the variation of the coefficient of friction due to a change in peripheral speed and the effect of a change in brush pressure on the coefficient of friction. The coefficient of friction of a good grade of electrographite brush suitable for railway work should measure about 0.22.



DIAGRAMS SHOWING EFFECT OF BRUSH PRESSURE ON CONTACT DROP, EFFECT OF PERIPHERAL SPEED ON COEFFICIENT OF FRICTION, EFFECT OF CURRENT DENSITY ON CONTACT DROP AND EFFECT OF BRUSH PRESSURE ON COEFFICIENT OF FRICTION

Hardness—The hardness of a brush relates to the compactness of the mass of the brush as a whole and depends on the cohesion of the particles on its surface, as determined by its capacity to scratch another or to be itself scratched. It is expressed by a figure which shows a relative measure of ability of its surface to resist penetration. There is no absolute unit of hardness, and the readings obtained on the scleroscope are relative figures, which are useful only for the purpose of comparison, but which are very essential as a check on the uniformity of the product. The hardness figures as determined are usually an indication of the strength of the brush. A scleroscope is shown in an accompanying illustration. For the scleroscope test the finished carbons or any small piece of carbon with a smooth polished surface can be used. The sample carbons are placed on the heavy base plate of the instrument directly under the graduated glass tube which contains a diamond-point hammer. The hammer is made to drop from a fixed height upon the test piece of carbon. The rebound of the hammer is measured by means of a fixed scale graduated from 0 to 100.

Results obtained vary from 10 to 75 for brushes, depending upon the material and methods of manufacture. Brushes are graded according to their scleroscope readings as follows:

Scleroscope Readings	Degress of Hardness
0-15	Very soft
16-30	Soft
31-45	Medium
46-60	Hard
61-75	Very hard

A good grade of electro-graphitic brush suitable for railway work should have a hardness figure of about 60.

Toughness—A brush is tough or strong when it will endure the application of force without breaking or yielding, possessing the quality of flexibility without brittleness. The strength of a brush determines its ability to withstand chattering in the carbon box without chipping or breaking. It is expressed in pounds per square inch.

A special testing machine is used for making this test and test carbons are cut ½ in. square and 6 in. long. The test piece is placed on two knife-edge supports, 4 in. apart, and the load is gradually applied at the center until the piece breaks. The strength is computed in pounds per square inch by means of the following formula:

$$S = \frac{WcL}{4I}$$

where S = strength in pounds per square inch, W = load in pounds, c = one-half the thickness of the test piece, L = distance between supports, I = moment of inertia, $\frac{1}{192}$ in this case.

Typical test results vary over a considerable range from 1,000 to 8,000 lb., depending upon the material entering into the mixture as well as the method of manufacture. The strength of a good grade of electrographite brush suitable for railway work should be about 5,500 lb. per square inch.

Abrasiveness—Resistance to abrasion or scouring action of the carbon brush is the ability to withstand the wear due to friction. This term should not be con-

fused with hardness. Hardness relates to compactness of the mass as a whole, while abrasiveness relates to the cutting action of the brush due to the presence of gritty particles in the brush mixture.

There are no reliable tests for abrasiveness. Efforts have been made to develop an apparatus to test this characteristic, but these have failed to produce results that check with actual experience with the different grades of carbons under service conditions. This is attributed to the influence of the commutating currents on disintegration at the brush face, which cannot be reproduced on the testing machine. Brushes which show decided abrasive characteristics in operation will sometimes glaze over on the test machine and run for a long period of time without wear.

The abrasiveness of a brush depends on the composition and the amount of the ash which forms a part of the brush. It can be controlled by varying the mixture that enters into the various grades of brushes. Silica, mica and carborundum form the larger part of the abrasive material found in the ash of carbon brushes. The best modern practice among railway operators is to keep the mica of all commutators undercut, hence an abrasive brush is not required; in fact, it is objectionable, as it tends to wear the copper more rapidly. In this connection, it might be added that in the case of a motor which commutates poorly an abrasive brush may be required to keep the commutator surface well polished. A good grade of electro-graphitic brush suitable for railway work should be non-abrasive.

Density—The density of a brush is the quality or state of having the constituent parts massed or crowded together. The real density of a brush is the weight of the carbon, exclusive of pores compared to the weight of an equal volume of water, while the apparent density is the weight of the carbon with the pores compared to the weight of an equal volume of water.

The equipment necessary for determining density is a micrometer reading to 0.001 mm. and of a size adaptable to the test specimen and an analytical balance weighing to 0.0001 of a gram. For the test specimen 2½ in. x ½ in. x ½ in. is a convenient size.

The test specimen is carefully measured for length, width and thickness and the volume is computed in cubic centimeters. This piece is then weighed and the apparent density computed by comparing it to the weight of an equal volume of water. The real density requires a more elaborate test as it is necessary to take into account the porosity of the material. To do this a sample of known volume is saturated with a liquid of known density and the weight of the saturated piece is determined, the apparent density of the sample having been previously calculated. It is then possible to make a correction for the liquid used to saturate the sample and to determine the real density of the test carbon exclusive of the pores by comparing this correct weight to the weight of an equal volume of water.

As the average real density of carbon brushes is 2, the apparent density will vary below this value, depending on the porosity of the finished carbon, which is determined by the material of the mixture and the process of manufacture. The apparent density of a good grade of electro-graphitic brush suitable for railway work should be approximately 1.5.

Thermal Conductivity—The thermal conductivity of a carbon brush is the property of receiving and transmitting heat through its homogeneous mass from particle to particle and from one body to another when in contact. There has been no practical laboratory method developed for testing this characteristic of carbon brushes. This property depends upon the material in the brush as well as the method of manufacture. There is no practical unit of measurement of this characteristic. Graphite has a higher thermal conductivity than most forms of carbon. A good grade of electro-graphitic brush suitable for railway work should have the maximum thermal conductivity allowable.

Checking Dimensions—A caliper rule is used to check the length and width of brushes and a special gage to check the thickness. The type of gage shown in an accompanying illustration has proven very satisfactory, inasmuch as it can be adjusted when worn. When the plates forming the side of the gage become worn it is only necessary to dismantle the gage and regrind these plates to a true surface. When it is again assembled the gage will be restored to its original accuracy.

The finished carbons are checked for length and width, using the caliper rule, and then they must pass through the slot in the gage marked "go in" and not enter slot marked "not go in."

Of the three dimensions of a carbon brush the accuracy of the thickness is most important as it is essential that brushes have a snug fit in the carbon box to allow easy movement and at the same time prevent chattering. For unplated carbons, such as used in railway work, brushes should come within the following "tolerances": Thickness, 0.001* in. over to 0.003* in. under; width, nothing* over to 0.016† in. under; length, 1/32 in. over to 1/32 in. under.

The above allowances are in accordance with the specification as adopted by the Power Club and tentatively adopted by the A. E. R. A. committee on standards.

In the preparation of this article the writer has been indebted to H. A. Humiston of the National Carbon Company and W. C. Kalb of the Corliss Carbon Company for very valuable suggestions and assistance.

Hand Filing of Rail Joints Facilitated

THE United Railroads of San Francisco has facilitated the work of filing down rail joints by hand, presumably on isolated small jobs where the amount of metal to be removed is small, by providing a handle for the large files used. This handle consists simply of a piece of iron rod bent into U-shape, with a hole at one end, into which the tail of the file is inserted, and a



HAND FILE EQUIPPED WITH DETACHABLE HANDLE FOR USE ON RAIL JOINTS

clamp at the other end which fits over the file and is tightened by means of a thumbscrew. The handle can be removed in an instant by simply loosening the thumbscrew. Its use permits the workman to file longitudinally along the head of the rail as well as across it.

*Each brush shall pass by its own weight through a gage of these dimensions.

†The brush shall not enter a gage of these dimensions.

Rebuilding Old Rolling Stock

Scranton Railway Bringing Fifteen Old Cars Up to Date by Installing Modern Equipment for City Service

THE Scranton (Pa.) Railway is rebuilding fifteen of its older type of closed cars. This work was started some time ago and at present the reconstruction of twelve cars has been completed. The old cars, one of which is shown in accompanying illustrations, had full longitudinal seats and sloping sides, stationary sash and bulkheads.

The first steps in the reconstruction were to remove all sash, seats and control equipment, take off the sheathing and take out the bulkheads. The posts were spliced, new side sills added and ⅛-in. steel sheathing applied. The new sash have the upper half stationary and the lower half raises. New pantasote curtains were



A DIFFERENT LOOKING CAR AFTER GOING THROUGH THE SHOP

installed. The new seating arrangement includes twelve Hale & Kilburn transverse seats, while the end seats, built in the shop, are longitudinal. New floors have also been laid.

Four ventilators have been installed in the monitor roof of each car. Some of these are the Utility Honeycomb, while others are Garland type E. Keystone signs have been installed, also the Consolidated buzzer system and twelve cross-seat, four panel and two vestibule Consolidated heaters. The Consolidated door signal system is also used. Other new equipment includes National pneumatic air-operated doors and steps, Golden Glow headlights and Economy meters. The cars are equipped with General Electric No. 70 motors. The new lighting arrangement includes four five-light series of 23-volt lamps, two rows of five down the ceiling of the car, one light outside over each door and one on each platform.

Flashing of Railway Motors Caused by Light Loads

A SOUTHERN railway company bought three second-hand cars equipped with four motors of the non-commutating pole type, which gave considerable trouble due to the motors flashing. Upon investigation it was found that the original owners operated these cars on a belt line where they ran in one direction only and the brushes on these motors had been given a back lead for this single-end operation. However, after the brush holder rigging had been changed and the location of the brushes had been adjusted to the neutral position for double-end operation it was noted that when the cars reached a certain speed the motors would tend to flash over and give some trouble. By accident it was learned that by cutting out one motor on the car—it made no difference which one—and operating with the other three motors, under no condition could they produce a flashover. This condition existed on all three cars and was a mystery for some time to all those in charge of the equipments. Many special tests and investigations were made none of which led to any definite remedies, until the phenomenon was finally explained as follows:

Under the most favorable conditions the motors concerned were fundamentally very sensitive to flashing and very much more so on light loads and the consequent higher speeds that occur when the motors were taking a small amount of current. For this reason flashing resulted when the critical speed was reached. With one motor cut out, the other three motors were obliged to do the work of four, and the load per motor was increased; also there was a corresponding reduction in the speed at which the motor operated to a value below the critical point, so that the motors then operated satisfactorily without flashing.





AT LEFT, INTERIOR OF CAR BEFORE REBUILDING. AT RIGHT, MODERN INTERIOR OF CAR AFTER REBUILDING

Why Use Fuel Oil in Power Plants?

The Advantages Claimed for Fuel Oil Are Set Forth and the Changes Necessary in the Furnaces for Burning Crude Oil Are Described

WITH the present coal shortage the manager of the railway utility generating its own power naturally wishes to know the possibilities of using crude oil.

The advantages claimed for oil burning under stationary boilers may be listed as follows:

1. Oil fuel is cheaper than coal in most parts of the United States.
2. Boiler room labor can be decreased.
3. Ash handling expense is eliminated.
4. Fires need not be banked and each fire is working at high efficiency.
5. Although both oil and coal may be purchased upon a B.t.u. basis, the tests involved in checking oil values are more easily and cheaply applied by the smaller companies.
6. Oil fuel can be burned more efficiently than coal.
7. Boiler rooms and surroundings can be kept neat and clean.

Other Claims as to Fuel Oil

It is claimed further by those interested in promulgating the use of oil in boiler plants that one fireman can take care of ten oil-fired boilers, so that in large plants the decrease in labor required would be considerable. The cost of unloading coal, usually greater than that for oil, and the handling of ashes are eliminated. In the case of banked fires coal is being burned wastefully, whereas with oil-burning apparatus as soon as the load begins to decrease burners can be shut down or cut off entirely in any desired boiler or boilers and only enough fuel burned to maintain the load. By opening the proper valves at the burner more heat can be quickly obtained when needed. Longitudinal walls, placed in the fire box, confine the desired air supply to each burner, so that all those in use are operated at maximum efficiency. This is particularly important for boilers used on "stand-by" service. However, it is best to equip a boiler so that under ordinary conditions, with its changing load, all the burners may be operated with a corresponding intensity of fire, rather than to shut off entirely any number of burners when the load is reduced.

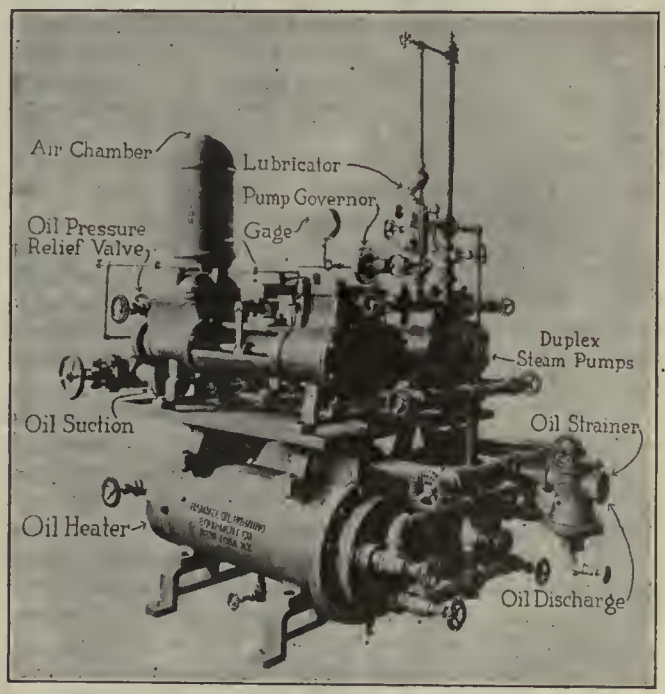
Assuming that fuel oil with 18,500 B.t.u. per pound is available in competition with a high grade coal testing 14,500 B.t.u. per pound, that the efficiency of the coal furnace is considered to be 60 per cent and that of the oil furnace 70 per cent, the theoretical equivalent for each long ton of coal would be 4.5 barrels of oil. Higher oil efficiencies than that assumed are, however, quoted which, if attainable in the average plant, would materially reduce the relation indicated. Managers in different sections of the country may readily determine cost comparisons for fuel if their boiler efficiency is known.

Among the manufacturers of apparatus for burning fuel oil is the Hammel Oil Burning Equipment Company, Providence, R. I. To the engineers of this company the ELECTRIC RAILWAY JOURNAL is indebted for technical information regarding the problems which are met in their work, the ways in which these have been met, etc. The accompanying halftone shows details of an oil-burning equipment as manufactured by this company and much of the following information relates to the application of this equipment.

New Equipment Required

Application of an oil-burning system to any station requires a storage tank for the fuel oil, a pumping unit for drawing the oil by suction from the storage tank and forcing it under pressure to the burners, a general piping system for the necessary oil and steam pipes and the furnace changes whereby the coal-burning furnaces can be transformed for the use of oil.

The storage tank may be either of steel or concrete, depending upon local conditions. The usual practice is to make the storage large enough for at least a two weeks' supply of fuel if the plant is located near an abundant source. From the relation of oil to coal necessary it is possible to determine the oil supply required. The reservoir should be as near the boiler room as possible to obtain the shortest pipe lines, although this location must necessarily conform to insurance and local

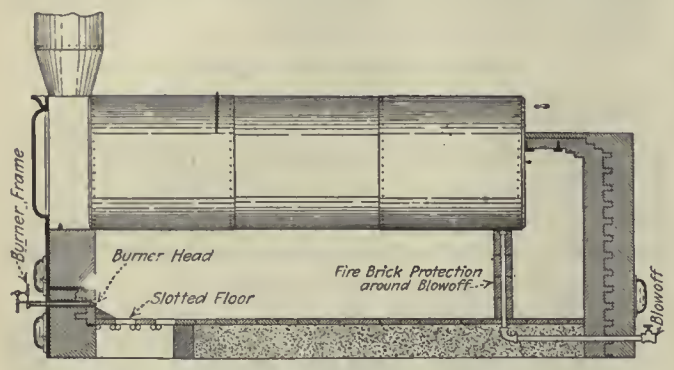


COMBINED PUMPING AND HEATING UNIT FOR OIL SUPPLY

fire regulations. Usually the reservoir is placed below ground, and adjacent to a railroad siding if oil is to be received in tank cars. Mexican oil, which is used very largely in the East, is extremely sluggish when cold, so that the tank cars are equipped with a steam coil for heating the oil to a temperature high enough to permit it to flow freely. In order to serve the largest tank car, the filling pipe should be at least 6 in. in diameter. A larger diameter may be preferable if the slope to the reservoir is not great.

A steam-driven pump is installed with its suction

connected to the main reservoir in order to force the oil under pressure to the burners. The Hammel unit consists of two standard duplex type steam pumps, furnished in several sizes, depending upon boiler capacity, specially fitted for fuel oil and including one or two heaters for heating the oil to the desired temperature for the burners. Only one pump is required at any time, the second unit being for use as spare equipment. The unit is conveniently piped so that either one or both heaters may be used with either or both pumps. It should be equipped with automatic governor to maintain constant pressure of the oil discharge, a pressure gage, automatic relief valve, suction and discharge thermometers, strainer, pump lubricator and air chamber for the purpose of eliminating pump pulsation.



FURNACE CHANGES FOR RETURN TUBULAR BOILER

Exhaust steam from the pumps is used to heat the oil in the heaters. No additional supply of live steam is necessary. The oil should reach the pump at a temperature between 80 deg. F. and 100 deg. F., and after passing through the heater should be between 140 deg. and 160 deg. F., the desired temperature for burning.

The pump suction line should of course be as short as possible and should be provided with a foot valve. A total lift of 18 ft. may be successfully used if the oil is kept at from 80 to 100 deg. F. and the suction line made as short as possible. The discharge line from the oil pump is generally dropped below the floor level and carried in a trench along the front of the boilers, with risers at the proper places for conducting the oil to the burners. A meter should be placed at a convenient position on the line between the pump and the first branch tee, if it is desired to meter the oil. The discharge line is carried beyond the burners and returned to the storage tank for the purpose of circulating the oil when cold and when the boilers are being fired after a period of shutdown. An additional meter is of course necessary in the return line.

Since the driest possible steam should be delivered to the burners, the steam line should have a gradual slope toward the boilers and discharge into a trap at its lowest point. Steam lines may also be required for heating coils in the storage reservoir and for connection to steam coils upon the tank cars.

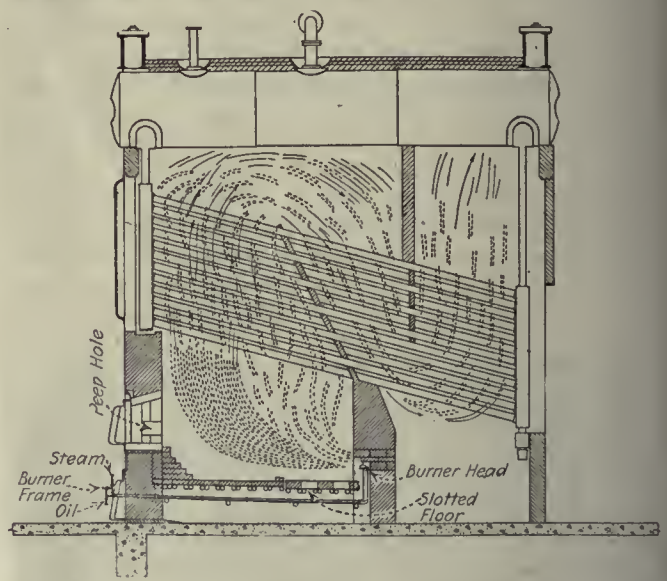
The burner in most common use for high pressure work is of the steam atomizing type. This has separate inlets for receiving the oil and high pressure steam. The oil is forced to the burner under a pump pressure, while the steam is generally under full boiler pressure at the burner throttling valve. The action of the steam inside the burner, and as it expands out of the burner into the combustion chamber, is to atomize the oil thoroughly into minute particles. When these particles are ignited a fan-shaped flame is produced which extends from the burner mouth over the full width of the combustion chamber.

FURNACE CHANGES NECESSARY

In order to change the furnace for the use of oil fuel, the grates are removed and the bridge wall torn down to approximately the level of the top of the ashpit door. A new floor of fire brick is then laid upon pipe supports. Slots between the bricks are left for admitting the necessary air for combustion, the air entering through the ashpit doors. The rear portion of the floor is laid upon an earth fill. All the walls of the furnace above the level of the new floor should be lined with firebrick. As an oil fire develops a more intense heat than coal, it is advisable to use the very best grade of firebrick, with a fusing point at least 3,000 deg. F. These should be laid with a very thin fire-clay joint, the brick being rubbed into place without the use of a trowel. In order to avoid burning the blow-off pipe, it should be encased in fire brick or wrapped with asbestos.

In the usual setting the new bridge wall is placed as far in the rear of the boiler as possible, but in the Babcock & Wilcox boiler the area of the second gas pass should not be decreased an abnormal amount. To insure good combustion there should be a distance of from 8 to 10 ft. between the front wall and bridge wall. Within certain limits, the higher the boiler setting, the better the efficiency, especially at high overloads.

The burners for return tubular boilers are located in a small hole cut as low as possible in the cast-iron front of the boiler without interfering with the free paassage of air through the ashpit door. In the Babcock & Wilcox, Stirling and Aultman & Taylor boilers the burner heads are located in notches in the bridge wall, the latter protecting them from the intense heat of the furnace.



APPLICATION OF OIL BURNERS TO WATER-TUBE BOILER

The number of burners for each boiler depends upon the width of the latter, the boiler design and local conditions. Average practice provides from one to four burners per boiler, *i.e.*, approximately six tubes, or a width of from 46 to 53 in. per burner. The whole burner frame can be easily and quickly detached by breaking two unions, when it is necessary to clean the burner. Then, by turning the frame sideways, both burner and frame can be slipped out of the ashpit door.

Electric Locomotives in Two Wrecks

Man Failure and Act of Providence Are Causes of Two Accidents on C., M. & St. P. Mountain Division—Electrical Equipment in No Way at Fault

ELECTRIC locomotives featured in two serious accidents which occurred in the spring in the Pacific Coast section of the Chicago, Milwaukee & St. Paul Railroad. All of the evidence has been taken and it is now possible to look back calmly upon the two accidents and to cite the circumstances on which B. B. Greer, vice-president, based his statement that one of the accidents was purely a case of man failure, while the other was the result of an act of providence, and in neither case was the electrical equipment or electrical operation of the road in any sense responsible.

One of these accidents is intensely interesting and informative as to the difficulties of mountain railroading. At 4:20 a.m. on June 16 train No. 74, with helper electric locomotive No. 10,239 on the front and a Mallet road engine on the rear end and fifty-eight loaded freight cars and one water car in the train, left Boylston, Wash., after the usual inspection of brakes.* A short distance east from this point the train began its descent of the long 2.2 per cent grade known as Beverly Hill

The engineer, who was an experienced man, allowed his train to gather momentum up to a point where regenerative braking in parallel could be cut in. The permissible speed for cutting in the motors for regenerative braking is from 15 to 20 m.p.h. Apparently this engineer waited for the speed to exceed 15 m.p.h., but failed to cut in his regenerative switches until the speed had reached at least 20 m.p.h., and the breakers would not hold. The confusion in his mind resulting from the operation of the overload relays caused a loss of action on his part for perhaps a fatal half minute, during which time the speed of the train kept rapidly increasing. The engineer then made a service application of his automatic air brakes, but this did not check the train. He tried to cut in the regenerative system a time or two, but the speed was too high and the breakers would not stay in. The service application of air was then released and an emergency application made, but the speed must have reached 35 m.p.h. by this time and the brakes had no effect in checking the train.

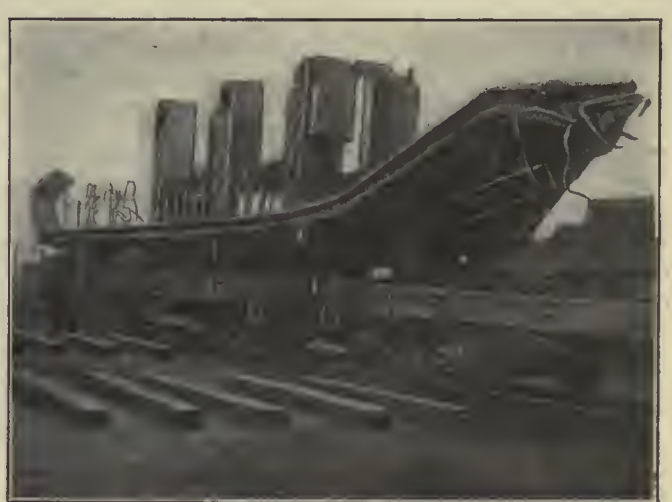
Running away, the train proceeded down the grade for a distance of 12 miles at a speed which is estimated was not in excess of 35 m.p.h., since it was held back to a certain extent by the independent driver and tank brakes on the Mallet engine on the rear, the retainers and the thirty-five hand brakes set up by the train crew. The train remained intact from the top of the hill to a switch at Doris, 12 miles, where the Mallet engine broke off the train on account of the tank becoming derailed. Presently this engine also left the rails, but was only slightly damaged.

Released from the holding power of the rear locomotive, the train gathered speed rapidly, and a little farther on twenty-eight cars of lumber and shingles piled up in a short space and were all consumed by fire. The remainder of the train proceeded eastward about 2½ miles, when thirteen more cars were derailed. Of these cars seven, carrying lumber and shingles, were badly damaged, but six cars carrying oil were practically unhurt. The remaining seventeen cars attached to the electric locomotive ran 1,000 ft. east of this point, where they were badly derailed in a short space and burned.

The electric locomotive, completely released from the train, proceeded 7 miles farther to a point 3 miles east of Beverly and stopped. The speed tape in this motor indicated that it ran at a maximum of 50 m.p.h. at some point, presumably after the Mallet broke off. There are several 10-deg. curves on this steep grade, and even with the excessive speed of the motor it did not leave the tracks nor did it cause any damage to the track. The total damage to the electric locomotive consisted of one motor-generator winding badly burned, one set of tires badly flattened and some minor damage to electrical connections. The entire damage, however, was slight.

*A map and profile of this section of the railroad will be found in the issues of this paper for Nov. 3, 1917, pages 819 and 820; Nov. 1, 1919, page 830; March 6, 1920, page 481.





PARTS OF WRECKED MILWAUKEE LOCOMOTIVES AS RETURNED TO THE WEST TACOMA SHOPS
These underframes are being straightened and the rehabilitated locomotives will soon be in regular service.

The first recorded indication of trouble was when the breakers at the Kittitas substation blew out, indicating the operation of the overload relays on a locomotive on the line. This occurred at 4:26 o'clock and records the time when the engineer first cut in his regenerative braking. At 4:45 o'clock the trolley line and feeder line at Doris substation went out, and at 4:48 the high-tension line went out on account of being broken with the derailment of the first lot of cars.

So far as the braking power of the train is concerned, the company has always considered the regenerative system as entirely supplementary to the air brake system and has drilled its engineers to place primary dependence on the air brakes. In this particular case, the tonnage of the train was 2,480, while the air brakes would hold 4,000 tons on this grade, providing the speed is kept below 15 m.p.h. The regenerative features in addition should hold 1,500 tons. This points to the fact that there was no question of braking capacity involved in this wreck. The fact that 15 m.p.h. was the maximum speed of freight trains permitted before electrification, while this is the minimum speed at which the regenerative features may be placed in operation, makes the opportunity for man failure particularly critical. The men are instructed to test the holding power of their brakes before attempting to cut in the regenerative system, but there is a possibility that this may not have been done on this particular train owing to the general desire to take advantage of the regenerative features for saving energy at the earliest possible moment upon descending a grade. Full examination has determined that the electrical condition of both the locomotive and the substations was absolutely normal and that each part of the equipment was functioning normally. The entire responsibility is placed upon the engineer, who failed to cut in his regenerative braking until the speed had become excessive.

Big Slide Wrecks Two Locomotives

The other accident referred to occurred at 11:30 a.m. on Sunday, May 23, at a point 3 miles east of Ragnar, Wash. In this case two electric locomotives running light, with only a caboose attached, were just in time to reap the full result of an enormous slide on the side of a mountain which took away a considerable section of track.

A watchman patrolling the track happened to be in this vicinity at the time the slide occurred. He heard a rumbling noise and saw the slide start and could see that the track was going to be carried away. He knew that a passenger train was due there in a little while, and he hurried up the track to flag this train, not knowing about the two electric locomotives which were proceeding from the opposite direction.

These locomotives, Nos. 10,208 and 10,240, rounded a curve at 15 or 16 miles per hour and entered the sunken track, rolling and sliding down the slope to a point about 400 ft. below. The two engineers and two firemen carried down with them were practically uninjured. An instructor and brakeman had to be taken to a hospital, but they recovered. The cabs of both locomotives were almost completely wrecked. The underframes were badly bent and twisted and the sheeting on the sides and roof was stove in by hitting against rocks and trees as the engines slid down the embankment so that it was practically beyond reclamation. Inside the cabs the motor-generator sets, rheostats, control equipment, air compressors, wiring, etc., were practically all torn from their fastenings and damaged more or less. The engine trucks, short and long main trucks, driving wheels and motors of both locomotives were very little damaged. The brake rigging on one engine was little damaged, while that on the other was damaged to some extent.

With the two wrecked locomotives some 400 ft. below grade, it was some problem to salvage them. This work was finally accomplished by loading the engines by pieces on wagons and carting them to North Bend on the Everett line, a distance of 7 miles, where they were loaded on cars and sent to the Tacoma shop.

Chicago Employees Support Commission

IN ITS current issue (Aug. 14), the *Union Leader*, official organ for Chicago of the Amalgamated Association of Street and Electric Railway Employees, has a strong editorial commendatory of the Illinois Public Utilities Commission.

Emphasizing the difficulty of the problem of the utilities with rising costs and fixed rates, the editorial says the commission members have attacked it fearlessly, honestly and in a practical way. These men of technical training and high ability, the "least understood, hardest worked and most abused" of all persons serving the Illinois public, are honorable men, and because they have done their duty have been "unreasonably criticised and abused by newspapers and politicians" who selfishly play the political game rather than work for the public welfare. The editorial concludes as follows:

> We hold no brief for this commission, but have had occasion to observe its work and realize some of the difficulties it has labored under. We know that by using good judgment the members of the commission have saved the people of various communities in Illinois much inconvenience. For the valuable service they have given they are entitled to credit and a deeper appreciation by the press and people of this state.

Materials Handling Association

THE American Society of Mechanical Engineers has authorized the formation of a Materials Handling Section, the first and organizing meeting of which was held on Friday, Aug. 13, at the Engineering Societies' Building, New York.

It was indicated in this meeting that the work of this section of the American Society would be to study principles of the handling of materials, including the general problem of transportation, not of any particular transportation agency, but from the standpoint of linking up the transportation agencies so that material could be handled through in such a manner as to keep to a minimum the total cost of handling the material. Naturally, a large part of the work of this section will have to do with the handling of materials in manufacturing establishments.

In the article in last week's issue on "Training Platform Men" in Los Angeles, by J. G. Jeffrey, Director of Public Relations Los Angeles Railway, two titles were given to the author. That just mentioned with the Los Angeles Railway is correct. The title also given to him as an officer of the East St. Louis & Suburban Railway was due to a misplaced line, which was not caught by the proofreader.



Shop, Track, Power and Line

These Articles and Ideas Are From Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort — If You Have Something Good Pass It Along



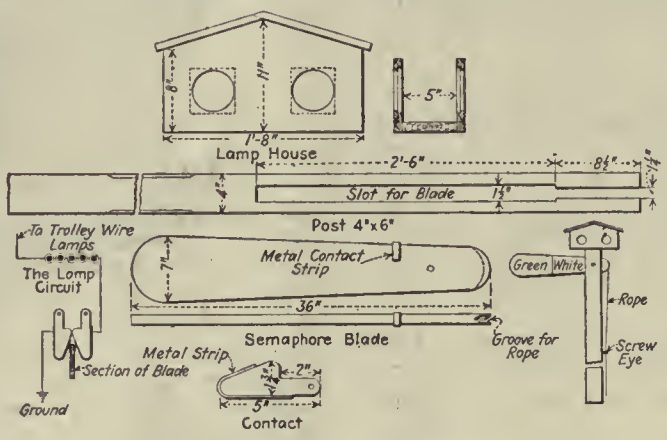
Interurban Car Stop Signal

Semaphore with Signal Light Connection Operated by Waiting Passengers Substituted for Hand Signal System Commonly Used by Texas Railway

VERY few interurban railways have provided any special means for the convenience of passengers who wish to stop cars. In towns and cities and on lines where there are stations with ticket agents interurban cars make regular stops and this problem does not arise, but in country districts where stops are ordinarily not made between terminals, unless the cars are flagged, the usual method for stopping a car is for the passenger to wave his hand, hat or handkerchief as the car approaches in the daytime and to wave some sort of a light at night. As lanterns are not usually available, passengers resort to burning matches, pieces of paper or any other inflammable material which will produce a light. In windy or rainy weather the producing of such a light is quite a problem for the passenger, and it frequently happens that a car passes, leaving a dissatisfied customer and causes inconvenience, especially where the cars run at infrequent intervals.

In addition to this method being unsatisfactory, it is often quite dangerous, as was found by the Galveston-Houston Electric Railway, which lost a station at Dickinson by fire, started from a burning wisp of paper thrown hastily aside by a passenger as the car approached.

This experience led the railway company to install a type of semaphore and light signal, details of which are shown in the accompanying illustration. The essential parts of the device are a lamphouse and a semaphore blade, together with posts and contactors. The lamphouse is provided with green and white lenses on each side. Openings for these lenses are cut square half way through the sides and round the remainder of the way. This allows square pieces of glass to be used. Five lamps are installed inside the house connected in series to provide for the use of line voltage for lighting. The ends of the lamphouse are left open, so as to allow the heat from the lamps to escape.



DETAILS OF STOP SIGNAL

The lamp sockets are installed against the roof bottom side up, so as to avoid any trouble that might result from rain. The lamps project downward from the socket. As shown in the sketch of the assembled signal, it will be seen that the lamphouse sets on top of the post. This post is slotted directly underneath the house to provide for the semaphore arm. The slot is made to fit the semaphore arm at the fulcrum, but below this point it is widened so as to provide clearance for the blade and prevent rubbing against the sides of the slot. The short end of the blade has a groove into which a rope fits for operating the signal. A contact device is provided just above the blade for closing the circuit and lighting the lamps. The contacts consist of two pivoted arms with metal strips around the lower end. These contact arms are held together by means of a spiral spring, which runs across from one to the other. The contact parts are ⅝ in. thick. A contact is also provided on the upper part of the semaphore arm in such a location that when the blade is raised by pulling the rope this metal contact will close the circuit between the two contact arms. A stop made of a small angle iron is placed at the bottom of the post under the blade. This prevents the blade from being raised above the horizontal position when the rope is pulled. Half of the blade is painted white and the other half green to correspond to the colors of the lenses used. Of course any colors can be used to suit conditions. On this road it has been found that where two bullseye lenses are used a coat of white paint applied to the surface of the white lens dims this light sufficiently so that the green light is more readily discernible.

At locations where there are station agents and where trains do not ordinarily stop except on signal the signals are arranged to be operated from the agent's station and an additional lamp compartment with red lenses is provided. This latter serves as a train order stop signal. An additional blade is provided which is painted red and has contacts for closing the circuit through the lamps in the house having the red lens. This blade is controlled only by the agent and dropped

from the top instead of being raised, as is done with the passenger's stop blade.

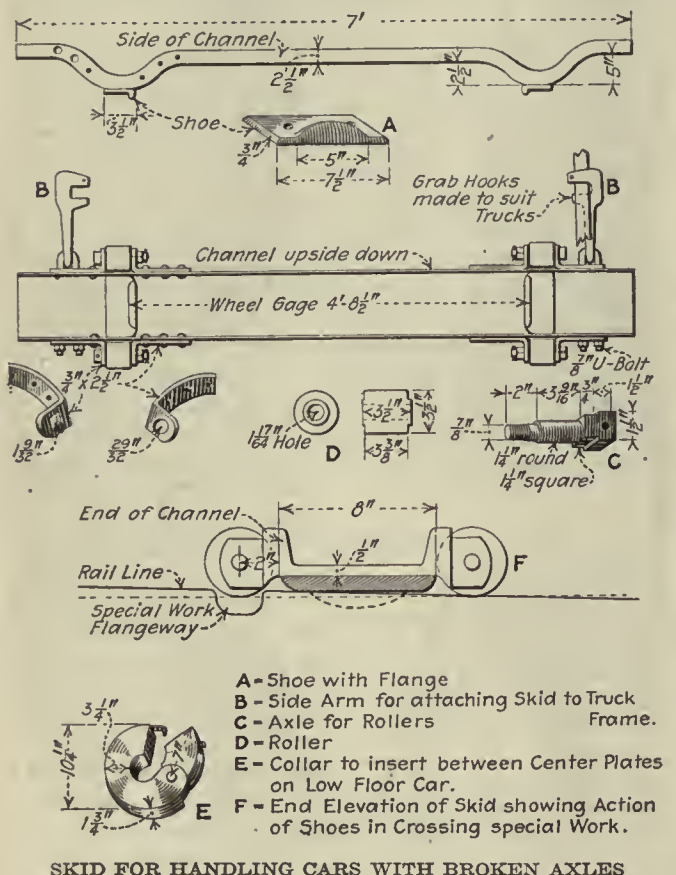
This type of signal has now been in operation for two years on our lines, has given marked satisfaction and has been enthusiastically received by the public.

Kinks from the Des Moines Shops

Sketches Show How to Make Vestibule Window Latch, Holder for Turning Trolley Wheels and Skid for Broken Axles

BY C. R. McMAHON
Master Mechanic Des Moines (Iowa) City Railway

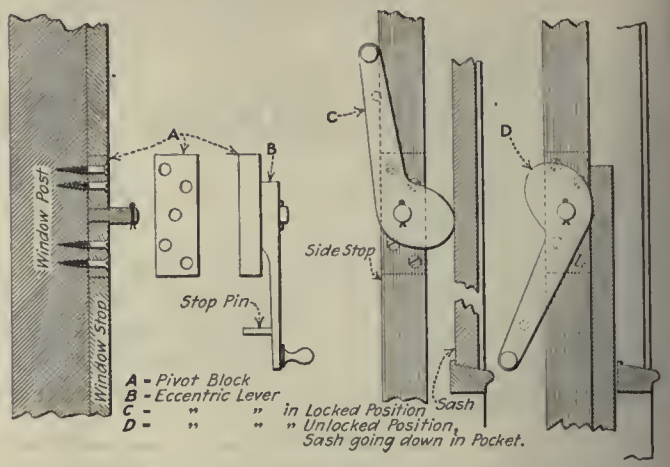
THE center front vestibule window on many cars is a source of trouble and annoyance to trainmen in bad weather, as wind and rain often blow in around the edges. Any permanent fastening of this window which would make it tight is undesirable, since it must be arranged for ready lowering when it is necessary to throw a switch. Most of this trouble can be avoided by making use of home-made latches of the design shown in the accompanying sketch. One of these latches may be installed at the top of the sash or a latch on either side. The sash should be reinforced with a piece of brass or iron where the latch comes in contact with it. The accompanying sketch shows only the idea without dimensions. All parts should be made of the proper size and shape to fit the particular type of sash and car.



SKID FOR HANDLING CARS WITH BROKEN AXLES

A HANDY SCHEME FOR TRUING TROLLEY WHEELS

Another sketch herewith shows a holder for truing up old trolley wheels. This device was made from a piece of old car axle and it serves the purpose very well. By using a stud of the right size to fit the wheel closely, bushing the wheel is made self-centering in the special

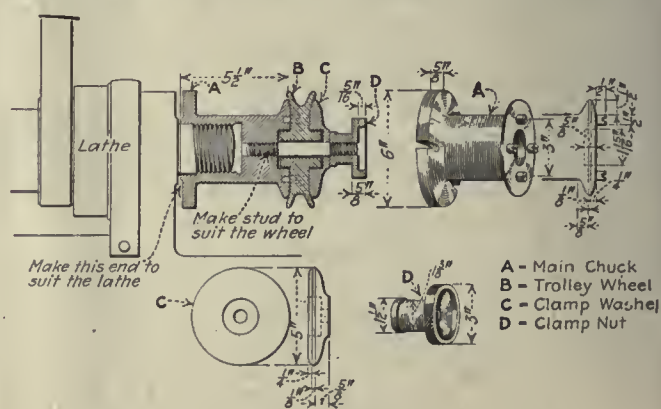


STORM LOCKS FOR MOTORMAN'S WINDOW

chuck which is made to fit the spindle of the lathe on which it is to be used. Four pins screwed into the face of this chuck project through the spokes of the wheel and prevent it from turning on the stud. The wheel is held in position against the face of the main chuck by a special washer and a knurled thumb nut which screws on the end of the stud. The turning tool used should be ground to the contour of a new wheel, making it a very simple matter to get a perfect job. After a wheel has been finished it is necessary only to loosen the knurled thumb nut, slip off the finished wheel, put another in its place and tighten up the thumb nut again.

A SKID FOR HANDLING BROKEN AXLES

The third sketch reproduced herewith shows a home-made skid for the purpose of bringing a car into the shop in case of a broken axle, locked wheels, etc. This skid may be operated successfully around curves and through switches, and, while it works better going ahead, a car can also be backed when the skid is in use. The device consists of an 8-in. channel supported by four 3½-in. rollers. The wheels of the broken axle are jacked up and the skid placed underneath them and attached to the truck frame by two side arms, the shape and length of which must be made suitable for the different types of trucks. A shoe mounted on the bottom of the channel between the rollers on either end is of such thickness that when the rollers are bearing on the rail this shoe clears the rail by ¼-in. In passing over special work, however, as the rollers drop into a flangeway, the shoe comes in contact with the rail, carrying the load and preventing the rollars from catching. These shoes also have a flange which keeps the



SELF-CENTERING HOLDER FOR TRUING OLD TROLLEY WHEELS

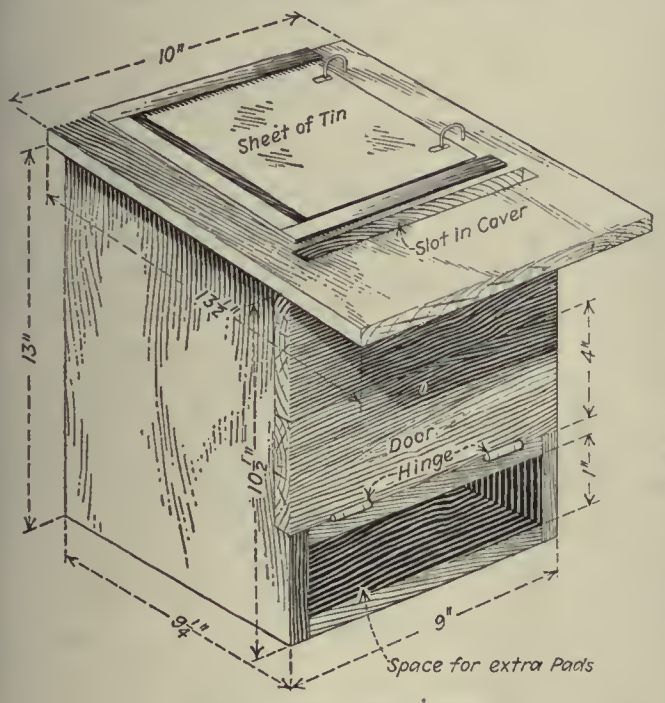
rollers on the track. When the skid is used with low-floor cars it is necessary to place an iron ring or hinged collar, as shown at *E*, between the body and truck center plates to prevent the motors from striking the car floor in going around curves. The axles for the rollers are made hollow and fitted with grease cups for lubrication.

The detail construction of the skid is quite completely shown in the accompanying sketch.

Train Order Desk Boxes

Galveston-Houston Electric Railway Has Replaced Train Order Machines by Home-Made Train Order Desk Boxes

WHEN the Galveston-Houston Electric Railway began operation all train order blanks for giving orders to trainmen by dispatches were printed in rolls. These rolls were placed in machines located in telephone booths and when an order was written two copies were run out of the machine by turning a crank, while a third copy was wound upon a roll that remained inside the machine. These machines gave considerable trouble and required considerable attention to keep them in good working order. The principal source of trouble was from the paper hanging up and becoming uneven while it was being run out.



TRAIN ORDER DESK BOX

In 1915 a hurricane passed through the section and every telephone booth along the line was upset and the order machines were wrecked in nearly every case. The cost of these machines was about $20 each at that time, so that their replacement represented a considerable sum. To reduce this expense C. L. Greer of the company suggested a train order desk box as being more simple and easier to maintain. After experimenting with several different modifications, a desk of the type illustrated herewith was adopted and has been in use ever since.

This desk box is made of poplar ½ in. thick and of dimensions as shown. A sheet of tin is loosely hinged on top of the cover by two staples, which pass through slots in the tin and into the cover. Each order blank has a carbon back and the sheet of tin is used to furnish the hard surface necessary for copying. As many orders as are needed can be made, while with the previous type of machines it was possible to make but three.

The cover of the desk is provided with a slot into which one copy of the order is placed for filing. A space underneath is provided for the storage of extra blank pads. All boxes are equipped with duplicate locks, which make it convenient to remove the orders for filing as only one key is necessary. The conductors on express and baggage cars keep the desk boxes supplied with extra pads and so far no maintenance expense has been necessary.

The cost of constructing these desk boxes was $3.60 each.

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Western Transportation Committee Appointed

A COMMITTEE of men from the Middle West and West has been appointed to handle transportation arrangements for the Western territory, particularly with reference to the special train which will leave Chicago on Oct. 9. The personnel of the committee is as listed below:

H. J. Kenfield, Chicago, Ill., general chairman.

Chicago: Williston Fish, Britton I. Budd, L. E. Gould, H. L. Monroe, C. W. Register, Frank Johnson, Harold Rudd, William Anderson, E. J. Magerstadt, R. R. Holden, Charles Knickerbocker, W. P. Butler, John Benham, Herbert Van Dorn, Arthur S. Merrill, William Simpson, M. A. Berg, E. H. Noyes, W. C. Burdick.

Illinois: A. D. Mackie, Springfield; H. E. Chubbuck, Peoria; J. R. Blackhall, Joliet.

Wisconsin: S. B. Way, Milwaukee; B. W. Arnold, Oshkosh.

Minnesota, North Dakota and South Dakota: Foster Hannaford, Minneapolis, Minn.; M. L. Hibbard, Fargo, N. D.; F. M. Mills, Sioux Falls, S. D.

Iowa, Nebraska and Kansas: B. J. Denman, Davenport, Iowa; R. A. Leussler, Omaha, Neb.; A. M. Patten, Topeka, Kan.

Montana, Idaho, Wyoming, Utah and Colorado: F. W. Hild, Denver, Colo.; J. R. Wharton, Butte, Mont.

Washington, Oregon and California: R. T. Sullivan, Tacoma, Wash.; Burton R. Stare, Seattle, Wash.; W. P. Strandborg, Portland, Ore.; J. A. Cranston, Portland, Ore.; G. J. Kuhrts, Los Angeles, Cal.; William Von Phul, San Francisco, Cal.; C. E. Heise, San Francisco, Cal.

Committee on Publicity Meets

THE American Association committee on publicity met at Association headquarters in New York on Monday, Aug. 16. Members of the committee present were B. G. Collier, chairman; C. B. Buchanan, W. A. Draper and C. D. Emmons; there were also in attendance J. H. Pardee, president; E. B. Burritt, secretary, and E. C. Faber.

Progress was made in deciding upon means and methods of accomplishing proper publicity, and plans for a specific working program discussed. Report was made of a meeting of the committee of publicity men held at the Association office last week.

Coal Supply for Electric Railways

UNDER date of Aug. 17 the American Association addressed to the Interstate Commerce Commission two letters relative to coal supply. One urged the importance of the enlargement of Service Order No. 9 or of the issuing of an additional order to provide for the storage coal requirements of electric railways. Exhibits were attached to show that much inconvenience and suffering will arise in the communities served by the electric railways unless some such provision is made.

In the second letter information is asked on the following points:

First—Can an electric railway owning coal cars of its own ship them directly to a coal mine with which it has a contract for coal and then have them shipped directly by the coal company to the electric railway's power station? If so, will the electric railway be charged for freight both on the coal cars returned to it loaded and also on the coal cars by it sent back to the mines empty?

Second—If such a procedure is followed, will the railroad company or companies over whose road or roads the empty cars and loaded cars, respectively, travel be permitted to use the cars for any other purpose or to divert them to any other use?

Third—If such a course is followed, will the railroad be permitted to confiscate the coal either presumably, or in fact, for its own use? If so, what would be the measure of damage the electric railway would be entitled to from the railroad company?

Illustrations were given to show why the answers to these questions are important to the electric railways, and the letter concludes with the statement that many of the companies are willing to go to the expense of owning their own coal cars if by so doing they can make sure of a steady and dependable supply of coal at their power stations.

The first of these letters was signed by Secretary E. B. Burritt and Charles L. Henry, chairman committee on national relations. The second letter was signed by Mr. Henry.

Exhibit Space Going Well

GEORGE W. WELLS, director of exhibits for the Atlantic City convention, to be held Oct. 11 to 15 inclusive, reports the names of 109 concerns which have been assigned space to date. A number of these are new exhibitors. Already 80 per cent of the space used last year has been engaged. Machine tool manufacturers, who have hesitated about exhibiting at the American Association conventions in the past, will show an interesting collection of machines in operation this year. One of the important features will be the large group of welding exhibits.

A sub-committee, appointed to investigate shipping conditions, especially for the benefit of Western exhibitors, has interviewed the chief freight officials of the Pennsylvania Railroad, who will actively facilitate the movement of freight to Atlantic City. Special representatives of this road will be appointed in Chicago and Pittsburgh to this end.

Reasonable haulage rates have been secured from the Eldridge Express Company of Atlantic City, which will make the same charges as at the June exhibit of the Railway Supply Manufacturers' Association, as follows: Consignments weighing over 300 lb. round trip, per net ton, $15; consignments weighing over 300 lb. one way, per net ton, $7.50; consignments weighing less than 300 lb. round trip, per case, $2.25; consignments weighing less than 300 lb. one way, per case, $1.50.

Following are the concerns which have engaged space to date:

American Association of Manufacturers of Chilled Car Wheels.
Ackley Brake and Supply Corporation.
Air Reduction Sales Company.
American Abrasive Metals Company.
American Crucible Products Company.
American Brake Shoe & Foundry Company.
American Steel & Wire Company.
Arthur Power-Saving Recorder Company.
Albert & J. M. Anderson Manufacturing Company.
Automatic Reclosing Circuit Breaker Company.
American Car & Foundry Company.
Bethlehem Steel Company.
Bridgeport Brass Company.
J. G. Brill Company.
The Buda Company.
Cheatham Electric Switching Devices Company.
Chicago Pneumatic Tool Company.
Chipman Chemical Engineering Company.
Cleveland Fare Box Company.
Barron G. Collier, Inc.
Columbia Machine Works & Malleable Iron Company.
Consolidated Car Fender Company.
Consolidated Car-Heating Company.
Curtain Supply Company.
Cleveland Frog & Crossing Company.
Dayton Mechanical Tie Company.
Drew Electric & Mfg. Company.
Dunbar Manufacturing Company.
Electric Railway Improvement Company.
O. M. Edwards Company, Inc.
ELECTRIC RAILWAY JOURNAL.
Electric Service Supplies Company.
Ellcon Company.
Fire Gun Manufacturing Company, Inc.
J. B. Ford Company.
Gurney Ball Bearing Company.
Galena Signal Oil Company.
General Electric Company.
Globe Ticket Company.
Gold Car Heating & Lighting Company.
Griffin Wheel Company.
Gould Coupler Company.
Hale & Kilburn Corporation.
Heywood Brothers & Wakefield Company.
Horrocks Desk Company.
Hubbard & Company.
Ingersoll-Rand Company.
Indianapolis Switch & Frog Company.
International Register Company.
International Steel Tie Company.
Irving Iron Works Company.
Jennison-Wright Company.
Kenfield-Davis Publishing Company.
Lorain Steel Company.
J. J. McCabe Lathe & Machinery Corporation.
Metal & Thermit Corporation.
Midvale Steel & Ordnance Company.
Nachod Signal Company.
National Brake Company, Inc.
National Car Wheel Company.
National Lock Washer Company.
National Railway Appliance Company.
National Pneumatic Company, Inc.
National Tube Company.
Niles-Bement-Pond Company.
R. D. Nuttall Company.
Ohio Brass Company.
Ohmer Fare Register Company.
Okonite Company.
Oxweld-Acetylene Company.
Pantasote Company.
Peter Smith Heater Company.
Perey Manufacturing Company, Inc.
Pratt & Lambert, Inc.
The Q & C Company.
The Rail Joint Company.
Railway Materials Company.
Railway Track-work Company.
Railway Utility Company.
Rail Welding & Bonding Company.
Reade Manufacturing Company.
Rooke Automatic Register Company.
Russell Manufacturing Company.
St. Louis Car Company.
Sattley Company.
Schutte & Koerting Company.
Sherwin-Williams Company.
Simmons-Boardman Publishing Company.
Standard Underground Cable Company.
Star Brass Works.
A. Stucki Company.
Taylor Electric Truck Company.
Thew Shovel Company.
Templeton, Kenly & Company, Ltd.
Texas Company.
Transit Equipment Company.
Thayer & Company, Inc.
Trolley Supply Company.
Tubular Woven Fabric Company.
United States Graphite Company.
Universal Lubricating Company.
Van Dorn Coupler Company.
Western Electric Company.
Westinghouse Electric & Manufacturing Company.
William Wharton Jr. & Company.
Wheel Truing Brake Shoe Company.
Wilson-Imperial Company.
Wilson Welder & Metals Company.
Alan Wood Iron & Steel Company.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Open Shop the Issue

Union Unable to Secure a Hearing from Court on B. R. T. Agreement—Walkout Threatened

Recognition by the company of the Amalgamated Association has come to the fore as the chief point at issue between Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, and the system's employees. Both Mr. Garrison and Federal Judge Julius M. Mayer have flatly refused to have any dealings with the association's representatives in the company's employ. The union leaders, for their part, have announced that unless their demands for a closed shop are met a complete tie-up of the B. R. T. lines will take place soon.

Prospects of a strike became more imminent on Aug. 16, when Judge Mayer refused to confer with union representatives on the question of the acceptance by the company of a new working agreement. The men intimated that they might walk out at any time after Aug. 28, when the present agreement will expire. Judge Mayer warned the union on Aug. 17 that under the terms of the agreement no strike could be called without thirty days' notice from the union.

Will Not Treat with Union

Mr. Garrison has announced his willingness to deal with the men as employees of the company. The receiver takes the stand that as the representative of the federal court he is not free to enter into an understanding with the union. In this course he is supported by Judge Mayer.

A letter setting forth his reasons for refusing to confer with the union officials was presented by Judge Mayer to the committee of the three presidents of the locals embracing a majority of the B. R. T. employees. In this letter Judge Mayer incorporated seven articles taken verbatim from the proposed agreement. They provide that all employees of the company eligible to membership shall be "sent by the company to join this association"; that employees in arrears of dues, fines or assessments shall be suspended, on the request of the officers of the association; that collectors for the association shall be permitted at all times to enter the property of the company, and that the company shall not enter into any agreement, verbal or written, with any newly formed labor or fraternal association. This clause was inserted for the evident purpose of shutting out of the company's employ members of the Brotherhood of Surface Employees of the Brooklyn Rapid Transit, an organization following the pattern of the Interborough Brotherhood, which the Amalgamated has been fighting for many months.

Other provisions contained in the proposed agreement are that any of the company's employees needed in the service of the association shall receive a leave of absence; that the association shall be permitted to distribute circulars and the like in any part of the company's property, and that no employee shall be discharged until after a hearing before a board composed of the officers of the company and of the association.

Would Mean Closed Shop

Concerning the extracts from the proposed agreement contained in his letter, Judge Mayer wrote:

> Obviously the federal court cannot permit its receiver to agree to provisions of this character. Without going into further detail, it is definitely plain that the three proposed amendments in effect demand of the federal court that the receiver must operate a closed shop. * * *
>
> If, as I assume from your letter, you desire to have a conference with me to ascertain my attitude in respect of a closed shop, I can only say that such a conference would not be of service, as the receiver has correctly stated my position. If, however, there are other matters which you wish to bring to my attention, I shall be pleased to consider any communication from you in respect thereof.

Pay Rise for Montreal Men

Reconsidering their action in threatening to strike unless their demands for higher pay were fully met, the employees of the Montreal (Que.) Tramways voted on Aug. 15 to accept the report of the board of conciliation granting them an increase in wages of from 25 to 30 per cent. Under the terms of the award the men will be paid at the rate of 45 cents; 50 cents and 55 cents an hour for first, second and third year men respectively. The wage increase will cost the company approximately $800,000 annually.

The agreement is to be effective until June 30, 1921. The men will receive back pay from July 1 last.

The men originally demanded an increase in pay amounting to 75 per cent, an eight-hour day and time and one-half for overtime. The case was presented to a board of conciliation, which made public its award on Aug. 5. The men at first voted to reject the board's report and gave the company twenty-four hours in which to grant their full demands. This action by the men called forth a sharp answer from the Tramways management. For several days a strike appeared imminent. The union later decided to reconsider the matter, and the acceptance of the award followed.

Tacoma Wages Adjusted

Small Increase in Pay and Some Concessions in Working Conditions Included in New Agreement

The question of wages and working conditions in Tacoma, Wash., during the year beginning Aug. 1, 1920, has been settled by representatives of the Tacoma Railway & Power Company and the union entering into an agreement granting a small increase in wages and some advantages in working conditions. The increase was ratified by the men by vote with a majority of nearly six to one.

The union attempted to get a closed shop agreement, but failed. The agreement, however, provides for no discrimination against any employee on account of his membership in a union, as well as no discrimination among union men against those who may not wish to belong to the union. There is to be arbitration of matters which cannot be settled amicably by a meeting of representatives of the company and men.

Motormen and conductors for their first six months of service, are raised from 50 cents to 55 cents an hour. Men in the second class, from six months to eighteen months in the service, will receive 59 cents instead of 55 cents an hour. Men of service more than eighteen months will receive 63 instead of 60 cents an hour. Gripmen on cable cars get 5 cents an hour extra, as formerly, but one-man car operators will get 5 cents instead of 4 cents an hour extra. The additional pay for breaking in students is raised from 2½ cents to 5 cents.

Shop Workers Get More

Shop employees get an increase of from 20 cents to 40 cents a day, except women inside carwashers, who are raised from $3 to $3.65 a day. When women wash the outside of cars, they are to get $4.40, the same as men. Wages for men in the shops range from $4.40 for unskilled to $6.20 for skilled labor. In the track department, workers get a raise of 5 cents an hour, to 55 cents. Those on a monthly basis get a flat $10 increase.

A concession to extra men guarantees them $100 a month, as a minimum, against $90 in the former argeement. Employees in train service working on regular runs are guaranteed not less than eight hours pay for each day's work, except Sundays, and runs totaling 7½ hours or more are to be considered regular runs. Time and one-half applies to overtime work, computed after eight hours work. Eight hours constitutes the day. Operators of one-man cars get a concession of ten minutes straight time for the preparation of their daily reports.

Wages Increased in Cincinnati

Men There Awarded Increase of Nine Cents After Very Careful Study of Economic Conditions

Motormen and conductors in the employ of the Cincinnati (Ohio) Traction Company have been awarded an increase of 9 cents an hour in wages by the arbitration board on a contract which runs for a year from July 1, 1920. They had asked an advance of 40 cents an hour. Nine hours is to constitute a day for the rank and file of employees, but the nine-hour day does not apply to the trainmen. The average run on regular trips on the system is 9.3 hours and this remains. The finding and the opinion of the arbitrators are of unusual importance because of the very thorough effort that was made to dispose of the question in the light of the actual needs of the employees under the present conditions of inflated prices. There was absent any tendency to arrive at a conclusion by compromising between the demands of the men and some offer by the company, the chief underlying principle adopted being to get at the facts and make a decision on the merits of the case in Cincinnati.

THE arbitrators were George Dent Crabbs, president of the Philip Carey Manufacturing Company, a large local industrial plant producing asbestos products, who represented the company; James A. Wilson, president of the Pattern Makers' International Union, who represented the men, and Prof. Alonzo Tuttle, a teacher of law in the Ohio State University. The appointment of Professor Tuttle was made by the Industrial Commission of Ohio, pursuant to terms of the contract between the company and the men, as the arbitrators named by the company and the men were unable to agree upon the third arbitrator.

The award of the board follows:

Section 5 of the agreement to be changed to read as follows:

Section 5—The wage scale of motormen and conductors from midnight June 30, 1920, to midnight June 30, 1921, shall be as follows:

First three months, 54 cents an hour.
Next nine months, 57 cents an hour.
Thereafter, 59 cents an hour.

Overtime for motormen and conductors shall be paid for at the rate of time and one-half time.

Crews of snow sweepers and salt cars shall be paid at the rate of time and one-half time for all time put in, including time spent in barns before taking out same.

Crews operating sand cars, pay cars, special cars, sprinkling cars, work cars, coal cars and supply cars, shall receive the regular rate of wage scale for conductors and motormen, nine hours to constitute a day's work. All platform work in all departments is to be performed by transportation men.

Electric shovel operators shall be paid 65 cents an hour, with time and one-half time for overtime, nine hours to constitute a day's work.

Barn men, members of the association, except car tenders and watchmen, shall be paid an advance of 18 per cent over the present rates. When this figure is less than one-half cent over the cent per hour, a half cent shall be added. When it figures over the half cent per hour, a cent shall be added. For illustration, if the advance is 8½ cents, it shall be 8½ cents; if it is 8⅝ cents it shall be 9 cents.

The company reserves the right to determine the number and class of men to be placed at each barn, and these men shall not be discriminated against because of their being members of the association.

In case of vacancies that may arise men are to be promoted from a lower to a higher rate of pay or from a night to a day shift, provided, in the opinion of the company, they are capable of filling the position paying a higher rate or the more desirable position.

Nine hours shall constitute a day's work. Overtime shall be paid for at the rate of time and one-half time.

All men working day shifts shall complete their day's work by 6 p.m. each day.

Barn men shall perform such duties as shall be regularly assigned to them or do such other work as the company may prescribe when necessary to facilitate the work.

Car tenders shall be paid at the rate of 45 cents an hour, nine hours to constitute a day's work, and time and one-half for overtime; and they may be promoted to fill vacancies in carhouses, provided, in the opinion of the company, they are capable of performing the higher class of work.

Watchmen shall be paid at the rate of 45 cents an hour, nine hours to constitute a day's work.

Incline gatemen, members of the association, shall be paid at the rate of 48 cents an hour, ten hours to constitute a day's work.

Curve cleaners shall be paid 45 cents an hour, nine hours to constitute a day's work. Overtime shall be paid for at the rate of time and one-half.

Section 20 to be amended to read as follows:

Section 20—All substitutes shall be guaranteed a minimum wage of $100 a month, to be divided $50 each pay day in the month, provided, however, that any man missing shall forfeit one day's proportion of said monthly guarantee for the day on which the miss shall occur, and any man absent on account of sickness, leave of absence or under suspension, shall lose one day's proportion of said monthly guarantee for each day of such absence or suspension. Men earning more than the guaranteed minimum of $100 a month or $50 per pay, shall receive in full the amount they earn.

The board recommends that all crane cars, work cars and dump cars be equipped with air brakes.

ASKED 80 PER CENT RISE

The men demanded an increase of 80 per cent over the old wages, double time for overtime and other conditions. The following table shows the old wages and conditions contrasted with the demands:

	Previous Scale (Per Hour)					Demands (Per Hour)				
	First 3 Mos.	Next 6 Mos.	Thereafter	Overtime	Work-Day	First 3 Mos.	Next 6 Mos.	Thereafter	Overtime	Work-Day
Conductors and motormen	.45	.48	.50	1½	9.1 hour	.85	.88	.90	double	9 hours
Sweepers	.675	.72	.75	...	.....	1.70	1.76	1.80	....	.....
Salt car	.675	.72	.75	...	.....	1.70	1.76	1.80	....	.....
Elec. shovel operators	.55	....	....	1½	10 hours	1.00	....	...	double	9 hours
Car tender	.37	....	....	1½	10 hours	.665	....	...	double	9 hours
Curve cleaner	.37	....	....	1½	10 hours	.665	....	...	double	9 hours
Watchman	.37	....	....	...	10 hours	.665	....	...	....	9 hours
Incline gateman	.40	....	....	...	10 hours	.72	....	...	....	10 hours
Barn men (general)	.425 to .58			1½	10 hours	.765 to $1.04			double	9 hours
Substitutes (guaranteed pay)	$85 per month					$153 per month				
Crane car	2 men (motorman and conductor)					3 men (2 conductors)				
Work train	2 men to 1 motor car and two dump cars — extra man for 2 additional dump cars (4 dump cars limit hauled).					Conductor to each dump car				

Professor Tuttle, chairman, in giving reasons for the award said:

The board in making the award was actuated by a desire to do justice to the three parties vitally concerned; namely, the men, the company and car riders of Cincinnati. Though prices entering into the cost of living in Cincinnati are, according to figures given us, about 12 per cent below the average city in the country, in respect to street-car service the cost in Cincinnati, as compared with most American cities is, and must be on account of its hills and extended service, unusually high. In considering, however, the rate of fare in Cincinnati, it must be remembered that there are several cities in the United States where the fare is much higher. These facts, however, do not blind us to the further fact that Cincinnati is already paying a high rate of fare, and seems destined to pay a higher rate still. In considering, therefore, any increase in wage to employees the board was confronted with the fact that any large increase meant an additional burden on an already burdened body of our riders.

The company, as is known, operates under a service-at-cost plan—to our mind an eminently fair and sound system and greatly to the credit of Cincinnati. In spite, however, of the guarantee of $416,000 to the company as a fair return to the stockholders, no dividends have been paid to these stockholders for the past five years, and as a result the stock has sold in the market at the low price of $21 per share on a par value of $100, with 23⅜ per cent unpaid accumulated dividends. While, therefore, the company may not seem to be concerned in this award under its service-at-cost franchise, it in reality is, for it is essential to the future financial prosperity that its return be such that it can finance its operation at other than ruinous rates, a thing apparently impossible. Could the company today borrow money to make needed improvements it could effect material economies in operation. It must be borne in mind also that there comes a time somewhere that increased rates do not produce corresponding increased revenues, because when fares get too high people will walk rather than ride wherever possible. There seems to be some slight evidence of this principle already working in Cincinnati. How much higher, if at all, the rate can go without this recession setting in cannot be said, though it is believed the limit is not far off.

The men, naturally, are vitally affected by this award. An increase of 40 cents an hour was asked, which, if granted, would have increased the cost of operation, according to figures by Mr. Culkins, street railway commissioner, over $2,500,000. This would have caused a very marked increase in the cost of fare—probably, according to the same figures, about 2½ cents a ride, unless economies in other directions could have been practiced to offset this large increase in expense. The board did not feel that any such burden could be put upon the car riders in Cincinnati.

On the other hand the board felt that the car riders of Cincinnati should not and would not object to having the men paid enough to keep even with the increased cost of living. Already the community is paying 2½ cents more than the pre-war rate of 5 cents to meet the increased cost of coal, labor and other materials, and it was felt that it was only reasonable that the further increased cost of living of the men should be paid for.

Figures given by both sides agreed that the increased cost of living in Cincinnati since Nov. 1, 1918, is about 18.3 per cent. Starting, therefore, with the award at that date by the War Labor Board to the employees of a maximum rate of 48 cents, which award we are compelled to assume was fair and just, and adding to that award the increased cost of living to July 1, 1920, of 18.3 per cent, we find that the present wage would be a little less than 57 cents an hour.

This would in itself seem to have been a sufficient increase, in view of the existing rate of fare in Cincinnati, were it not that the board was confronted with the further fact that since the War Labor Board has given its award in 1918 of 48 cents to Cincinnati, along with other cities, in many of these same cities a marked increase of wage has been allowed, as in Cleveland, where the wage is now 75 cents an hour. It is true there are many cities in the country where the wage is still

considerably lower than the wage awarded in Cincinnati. It is also true that in some of these cities where the wage has been greatly increased the cost of living is much higher than in Cincinnati, but the outstanding fact was that, whereas Cincinnati started in 1918 with the War Labor Board award of 48 cents, along with Cleveland and other cities, in Cincinnati there has been only a 2-cent increase since that time, while in many of those other cities the increase has been very much greater. This, to our mind, gave the men the right to expect something more than the mere increase to meet the increased cost of living.

In view of the fact, however, that many cities in the country as large as Cincinnati are paying considerably less than the amount here awarded, and also in view of the fact that the car riders in this city are already paying a high rate of fare, it did not seem to the board that at this time it was possible to give more than was given in the award above. It is further to be hoped that the company will introduce every possible economy consistent with good service to keep down operating costs, and in this way protect the car rider from mounting fares. It is believed by the board that, all things considered, the increase in the award given is manifestly fair to all parties concerned.

One of the features of the arbitration hearing was the absolute lack of public interest in the proceedings, although under the "service-at-cost" franchise held by the company the increase would pass to the car rider in the shape of an advance in fare. The rate has been 7½ cents (ticket) and 8 cents cash.

Company Shows Deficit

It developed during the hearing that the company had a deficit in June, and that preliminary estimate indicated a deficit in July. This means that the fare will automatically advance to 8 cents on Sept. 1. Vice-president Walter A. Draper of the company stated that to meet the demands of the men in full would require 3½ cents additional fare, making the fare 11½ cents.

W. Kesley Schoepf, president of the company, declared in his letter to the union that the men's demands were out of all proportion, and that he would under no circumstances approve expenditures on the part of the company that would add to the burden that the car rider is already carrying. This attitude on the part of the company was in contrast to criticism made when the "service-at-cost" franchise was under consideration by the City Council and to the effect that a franchise which passed expenditures on to the car rider would throw the door open for the company to become careless and extravagant.

The arbitration hearing was completed on Aug. 10. In the final argument the attorney representing the company brought out the fact that in the present contract with the men it was provided that, in connection with employees of a certain kind, they shall be promoted, etc., "provided, in the opinion of the company, they are capable of filling the position—". The insertion of the three words "and the association," after the word "company," was asked. These three words, argued the company's attorney, practically transferred control of the men from the company to the union—a dangerous and unwholesome condition. He said:

> If the labor situation had reached a point in this country where committees from the union would oversee the work of the men and recommend their promotion from one position to another conditions would be different. But as it is we contend that the company should have absolute veto power on promotion, and we most earnestly request that the arbitrators in this dispute will not put a change in the contract which will put the question of promotion into the hands of the men.

Both the company and the men submitted figures on the cost of living, and, by coincidence, it was shown that the increase since November, 1918, was approximately 18 per cent. The men, however, were continually pointing to Cleveland, where a higher wage prevails, and in the closing hours of the argument statistics were introduced to show the difference in the cost of living between Cincinnati and Cleveland. It required six and one-half days to submit and argue the case.

The company submitted data showing that 102 of the employees own automobiles. This is a ratio of approximately one auto to each fourteen employees, compared with one auto to each fifteen in the entire population of the city and county.

On the other hand, the men submitted a statement showing the result of a canvass made by them. The following figures are based on 1,511 replies received to the questionnaire:

Homes owned (unincumbered)	108	
Homes owned (mortgaged)	315	423
Married men		1,272
Average dependents		2.9
Single men		239

On the question of saving through economies in operation Vice-President Draper, of the company, stated that $200,000 a year could be saved by faster schedules, and if the company were permitted to organize its service on the split-run basis a saving of approximately 1 cent per passenger could be achieved. The company was unable to speed up schedules because of traffic congestion and parking in the down town section of the city.

The regular force of trainmen worked an average of 305 days during the past year. The actual earnings of these regular men, during the year, were:

No. Men	Range Yearly Wage
226	Earned under $1,500
203	Earned from $1,500 to $1,600
249	Earned from $1,600 to $1,700
180	Earned from $1,700 to $1,800
83	Earned from $1,800 to $1,900
50	Earned from $1,900 to $2,000
27	Earned over $2.00

(The maximum paid to one man was $2,167.65)

According to Mr. Draper the maximum possible earning for a regular man, working every possible day on regular runs, and the fifteen extra runs (allowed by the union contract) of 1½ hours each, would be $1,898 for the regular runs and $467.29 for the "extras," or a total of $2,366 a year.

The company has 1,176 regular motormen and conductors, and there are 1,302 regular runs.

The above earnings were made by the men on the scale of 45, 48 and 50 cents for platform service.

Des Moines Prospects Better

Means Appear to Have Been Found for Granting Company Fare Increase and Raising Wages

Movements looking toward the settlement of the railway problems of Des Moines, Ia., have developed with kaleidoscopic rapidity during the past week. As this article was written it appeared that a way had been found to grant at least a temporary 7-cent fare. This would permit better service and prevent a strike of the railway men called for Aug. 25, unless satisfactory arrangements between the Des Moines City Railway and its employees are made before that time.

THE first step was the appointment of a valuation board of three men by the City Council to value the property of the railway. The Council named Frank E. Lyman, chairman of the United Improvement Leagues, which had made a move toward a settlement; E. D. Perry, a Des Moines lawyer, and James King, of Toltz, Day & King, an engineering firm at St. Paul.

The appointment of this board, however, proved later to be a purely perfunctory action as the Council shortly afterward entered into a contract with Toltz, King & Day for the actual work of placing a valuation upon the railway plant. While the valuation board mentioned above has not been discharged the two Des Moines members are expecting to take only a nominal part in the work and leave the technical work all up to the engineering firm. Toltz, King & Day are to receive $14,000 from the city for arriving at the valuation of the plant at the present time and $2,000 for determining a valuation as of 1915, when the new franchise was granted the railway.

Almost immediately upon the heels of the Council's action in hiring the engineers came a strike vote upon the part of the union of railway employees. The men are demanding payment for the difference between the rate granted them by the arbitration board and that which was allowed by Judge Martin J. Wade of the federal court. The arbitration board awarded the men a maximum of 70 cents an hour dating from March 1 this year, but Judge Wade held that the revenues of the company were not sufficient to meet this increase and ordered that the 60-cent rate be maintained.

The next development was the decision by Judge Ben. I. Salinger of the Iowa Supreme Court, in the Ottumwa Railway & Light case that as the Iowa Legislature has not sanctioned the fixing of a permanent fare, rates named in contracts between Iowa cities and their utilities can be changed. This

decision was immediately seized upon by all parties in the Des Moines controversy as the way toward a settlement.

Intervention Being Sought

Petitions of intervention were then filed in the federal court, one by the railway union and one by Frank K. Mathis, a Des Moines property owner, looking toward relief of the city railway. At the time these petitions of intervention were filed the Des Moines City Railway petitioned the court for an increase in fare to 7 cents in order that it might meet the wage demands of the union.

Judge Wade set the hearings for Friday afternoon, but upon motion of the city attorneys ruled out the petition filed by Mr. Mathis. The city also resisted the petition by the employees, but Judge Wade held that as they were already before the court their petition would be made a part of the regular proceedings.

Special Counsel Byers, acting for the city, resisted the application of the ruling in the Ottumwa Railway & Light Company case to the Des Moines case as he claimed that Justice Salinger had made his ruling upon the basis that the Iowa Legislature and never expressly given to cities such as Ottumwa the right to make such contracts with city railways. Mr. Byers claimed that Des Moines is governed by commission plan law which expressly gives the city a right to enter into such contracts upon the approval of the voters.

Immediate Increase Refused

After hearing the case for the railway, the employees and the city Judge Wade gave practically an unqualified concurrence to the decision of Justice Salinger and suggested that the three parties to the case get together and try to work out a settlement. Then he tersely advised that unless they had arrived at an agreement before Aug. 20 he would take steps to end the controversy. The case is to be called for further hearing upon Aug. 20.

Judge Wade refused, however, to grant an immediate increase fare replying that the city had a right to take steps for temporary relief for the company.

Seven-Cent Fare Resolution Coming

Members of the City Council of Des Moines seemed ready to base a movement for increased fare on Judge Wade's ruling and Commissioner Budd announced that early in the coming week he would introduce a resolution in Council increasing the rate to 7 cents contingent upon the company increasing service and making satisfactory wage arrangements with the men.

The difficulties which have beset the Des Moines Company have been the subject of comment previously in these pages. The court decision on the wage arbitration some time ago attracted especial attention.

City Lends Aid

Co-operating with Rail-Light in Perfecting Toledo Service-at-Cost Grant—Company Encouraged

Attorneys for the Toledo Railways & Light Company and for the city of Toledo are now joining efforts to make the Milner cost-of-service ordinance error-proof before it goes to the City Council for passage before submission to the people of the city. When it was definitely known that municipal ownership, as planned by the commission appointed by Judge Killits, had been defeated the city administration prepared to submit to the electorate the measure which has been agreed to by Henry L. Doherty on behalf of the company.

Ultimate City Ownership

The cost-of-service ordinance for Toledo was drawn by a commission of five business men and is said to be one of the most modern of its type. It provides virtually for city ownership of the lines in the course of several years. The life of the grant is twenty-five years with a privilege of extensions at the end of the first ten years of its operation. Whenever the property has been amortized through the working of either the sinking fund provisions for retirement of bonds or the amortization fund on its last fifteen years, the property comes into the possession of the city.

The valuation agreed to in the ordinance is $8,000,000. This was reached after months of negotiation and finally agreed to by Mr. Doherty when it looked as though the municipal ownership enthusiasts might endanger the property by a poorly constructed and ill-planned effort toward public ownership of a transportation system.

The ordinance will probably be submitted to Council for passage on Aug. 25. It is now in committee and it is thought will be reported out favorably. The city law director and the Mayor have asked the traction attorneys to work with them in making the attempt to pass the ordinance and to make its adoption absolutely legal in every step. It will probably be submitted to the people at the general election on Nov. 2.

If Council fails to pass the ordinance it may be submitted to the people on an initiative petition signed by approximately 9,000 Toledo voters.

Heavy Vote on Measures

The vote on the twin bond ordinances was the most decisive registered in any election on local street railway questions. The $3,000,000 bond ordinance received only 8,534 favorable votes while it had 12,463 registered against it. The $4,000,000 twin ordinance received 7,901 favorable votes and 11,543 against it. Foreign wards brought in a slight majority for the measure while wards represented in Council by socialists voted against the public ownership propositions by large majorities. The "silk stocking" seventh ward voted almost 6 to 1 against the two ordinances. Only four of sixteen wards turned in small favorable majorities.

The vote was fairly typical of many other communities. The people of Toledo have voted several times in favor of municipal ownership of the street railway system when public ownership was merely a general principle and not hitched up to a specific and concrete plan for spending money. The vote itself was the first one favorable to traction interests since the Toledo railway problem has been before the electorate in one form or another for the last fifteen years.

The company immediately felt encouraged to go forward in improving many of its properties and orders were given to paint the cars and rush track repairs.

Lower Fare Possible

It is thought that a campaign of popular education on the cost-of-service plan may be able to secure its adoption at the election in November. All civic agencies have united in favor of it during the negotiations with Mr. Doherty over the matter of valuation. Coupled with the fact that it is drawn by citizens and provides for ultimate municipal ownership, is will also introduce a lower fare than the rate now in force and this feature may have vote-getting possibilities.

Strike on New York City Suburban Line

Service on the Manhattan & Queens Traction Company's lines between Manhattan and Jamaica was suspended entirely on Aug. 14 after the eighty-five employees of the company had voted unanimously to strike for wage increases of from 11 to 13 cents an hour. The company offered an increase of 5 cents an hour in an ineffectual effort to avert the walkout.

Unless a petition now before the Public Service Commission asking for a fare increase to 13 cents is allowed the company will be unable to meet the demands, officials of the line declared. The petition is for a zone system, the fare from Fifty-ninth Street, Manhattan, to Grand Street, Corona, to be 5 cents, and from there to the Jamaica terminus 8 cents. The fare for the entire distance is now 5 cents.

The company is in the hands of receivers. It has been striving for more than a year to obtain permission to increase fares. The company operates a line between Second Avenue and Fifty-ninth Street in Manhattan and the Long Island Railroad Station in Jamaica, a distance of about 11 miles. Its average daily traffic is about 14,000 passengers. An application by the company to the Public Service Commission for permission to raise the fare was nullified by the city, which obtained an injunction preventing the commission from considering it. Later the Court of Appeals reversed this action and the company has now pending before the commission an application for permission to increase fares.

All Lines Operating

Denver Tramway Restores Service on All Routes with Aid of Strikebreakers—Men Still Out

Although the employees of the Denver (Col.) Tramway are still on strike, every line in the city including the Interurban Lines to Golden, Arvada and Leyden have been in operation since Wednesday morning, Aug. 18. More than four hundred new men have been hired permanently to replace the strikers. G. H. Harry, representing the Department of Labor, arrived in Denver on Wednesday. After conferences with union leaders and later with General Manager Hild, Mr. Harry informed the newspapermen that he would stay in Denver until a settlement had been reached but that he had arrived after both parties to the controversy had fought each other to a standstill and that "about all he could do was to bury the corpse."

A MASS meeting of striking car men was called for Friday morning. They were to be addressed by Mr. Harry, who in company with Gov. Oliver Shoup held a conference with General Manager Hild on Thursday afternoon.

Strikers Lose Seniority Rights

Return-to-work applications signed by 900 of the strikers are reposing at strike headquarters until the strike leaders make up their minds whether to present them to the company. President Silberg and other members of the union executive committee are still in jail. Their four lawyers have announced that they will get them out of jail "if it takes them ninety days."

The radical section of the Denver Trades and Labor Assembly voted to demand a general one-day strike of all unions on Aug. 23 in sympathy with the tramway workers. Conservative union men oppose the movement.

At midnight on Thursday, Aug. 12, all tramway employees who had not filed applications for re-employment lost their seniority rights, pension privileges, and standings in the wage scale. On Friday it was reported than more than 100 former employees in the train service, shops and engineering department had applied for reinstatement. The remainder of the strikers refused to return to work upon assurances of the union leaders that their trump card was yet to be played. Men whose seniority dates back fifteen, twenty and twenty-five years are among those who have lost their rights by their refusal to file applications.

Leaders Won't Resign

The broad hints of Judge Greeley Whitford of the Federal District Court that the executive committee of the union should resign were met by declarations on the part of the committee members that they would not resign and that jail had no terrors for them.

Operation of the cars by strikebreakers unfamiliar with switches and curves has resulted in one runaway down a grade and four or five collisions and two derailments at high speed. There were no serious injuries.

Most of the jitney buses had gone out of business by Saturday, Aug. 14, upon the operation of as high as 215 motor cars by the tramway on all city lines except one, which was blockaded by sewer construction.

The annual convention of the Colorado State Federation of Labor at Pueblo on Aug. 13 requested Governor Oliver Shoup to have the strikebreakers discharged and former employees reinstated in their position. Governor Shoup replied as follows:

> I would be more than pleased to have the former employees of the Denver Tramway restored to their positions and I have used my best efforts to that end. But, as Governor, I cannot dictate to a private corporation whom it shall employ any more than I can dictate to an employee whether or not he shall work.
>
> The men have refused to return to work and I am unable to demand, or reasonably request, the company to discharge any men who are willing to provide the public with service. My first duty is to the people, whose interest in this controversy is paramount to either company or strikers.

The "trump card" of the union came to light Saturday, Aug. 14, when it was announced that, at the request of Vice-President Fitzgerald of the Amalgamated Association, G. Y. Harry, a Government mediator, was enroute from Portland, Ore., to attempt a settlement of the controversy in accordance with instructions from the United States Department of Labor. General Manager Hild said that he would be glad to talk to Mr. Harry, but that the settlement of the tramway controversy was rapidly progressing through the building up of an entirely new organiation of employees and that the company's position was unchanged.

Early Sunday morning 150 strikebreakers were shipped out of Denver by the tramway from its South Division carhouse. After the exodus of strikebreakers 150 new employees, together with all former employees who have been re-instated, were placed in charge at the South Division and took over the operation of all lines operating from this carhouse.

Free Jitneys a Union Weapon

The Amalgamated brandished a new weapon beginning Monday in the form of free jitney service, in an effort to force the tramway to accept the strikers' terms of settlement. These jitneys are attempting to duplicate service on all tramway lines. About 100 automobiles of all sorts are being employed in the service. The union is paying $4.50 a day to the strikers driving the cars and providing free oil and gas. No fares are charged, but gratuities are accepted.

Reports were circulated Monday that labor leaders had made a deal with the City Council whereby the company was to receive a 7-cent fare providing the strikers were taken back as a body and given a 62½-cent wage scale. When told of the 7-cent fare settlement plan, General Manager Hild said that he "did not see how the tramway could change its position, and that he and other officials had been so absorbed with the speedy restoration of service that the matter of a higher fare had been given no thought at all."

Seven-Cent Fare Not Enough

The company had previously announced that even with a 7-cent fare it could not grant a wage increase above 58 cents an hour, since all surplus revenue from increased fare would be needed for improvements and extensions of service.

An unexpected blow to union hopes came Monday afternoon when Judge Whitford sentenced the seven members of the union's executive committee to serve ninety days in the county jail and to pay the cost of court proceedings occasioned by the strikers' action. The union heads were taken immediately to the county jail.

Union Chiefs Go to Jail

In a last-minute attempt to stave off jail sentences the union attorneys entered as evidence of good faith 847 applications from members of the union signifying their intention of returning to work. These were individual applications, and according to the attorneys, had "no strings on them." The court declared that the applications could not be considered, especially since they had not been presented to the company.

Judge Whitford, in passing sentence, said:

> There are mitigating circumstances in connection with this action which the court cannot and will not overlook. To impose a small fine, however, would not be in keeping with the dignified administration of the law; a few days in jail would not, either, command respect. The court must administer the laws of the people without fear or favor, and must see that every infraction of same is adequately punished. The court, on hearings, has found that your action has been in violation of the laws of the majority of the people. It cannot do aught but impose a penalty.

Men Accept Winnipeg Award

Acting under protest, representatives of the union employees of the Winnipeg (Man.) Electric Railway have signed an agreement with the company providing for an increase in pay of approximately 10 per cent. The pay increase was recommended by the Myers board of arbitration, which heard the demands of the men for an advance amounting to 50 per cent.

The award as rendered was accepted by the company although it will mean an additional expenditure of about $300,000 annually, but was rejected by the men on the ground that they were entitled to at least 20 per cent more.

The agreement is effective from May 1, and the back pay to date under the conditions of the award will amount to approximately $70,000.

Financial and Corporate

I. R. T. Deficit Cut

New York's Commissioner Reports Surplus from Subway Operation for Last Six Months

A statement of the financial condition of the Interborough Rapid Transit Company, New York, N. Y., prepared by Transit Construction Commissioner John H. Delaney and made public on Aug. 14, showed that the earnings of the company on the city-owned subways during the last six months of the fiscal year ended June 30 last were sufficient to meet fixed charges and pay $5,330,-005 of the company's annual preferential of $6,335,000.

The jump from a monthly deficit to a monthly surplus began in December, 1919, when there was a surplus of $100,973, compared with a deficit of $67,045 in the preceding month. Thereafter there was a surplus every month except that there was a deficit of $16,607 in January and $199,703 in June.

The following table shows the gross revenue per month and surplus or deficit:

Month.	Gross Revenue.	Deficit.
July, 1919	$2,149,087	$299,212
August, 1919	2,052,741	408,917
September, 1919	2,286,301	325,264
October, 1919	2,586,303	145,945
November, 1919	2,614,894	67,045
December, 1919	2,948,520	*100,973
January, 1920	2,810,709	16,607
February, 1920	2,799,402	*86,597
March, 1920	3,039,540	*171,452
April, 1920	2,871,271	*53,319
May, 1920	2,850,011	*46,258
June, 1920	2,614,189	199,703
Total	$31,622,973	1,004,095

*Surplus.

SUBWAY DEFICIT $3,370,879

The total deficit of the subway division, including interest on previous deficits, amounted to $3,370,879. Deficits are cumulative and they must be paid, with interest, before any interest is paid on the city's investment. The operating expenses for the subways during the year totaled $12,785,581. The other principal expenses were: Maintenance, $3,794,756; rent paid the city under the original subway contract, $2,428,487; interest on the company's contribution for construction, $2,938,-944; interest on equipment, $1,320,000; company's preferential, $6,335,000. The total charges for the year amounted to $32,627,068.

During the first six months of the year the earnings fell $1,145,412 below costs, and during the last six months they exceeded the costs by $141,316, after all of the company's obligations, including the preferential, were met. The large earnings in March were explained by Mr. Delaney, who said that during that month the surface car traffic was crippled because of weather conditions. He also said that during June of the current year the gross revenues were $326,427 more than in the same month in 1919, when the deficit amounted to $233,059.

The Manhattan elevated division of the Interborough system, which costs the company rent of 7 per cent on a valuation of $60,000,000, was the company's most serious liability. Prior to the last fiscal year the deficit grew from $8,231,994.31 to $15,320,158.62. Gross operating revenues for the year amounted to $19,829,482, and expenditures, including operating costs, rent, maintenance, depreciation, interest charges and the preferential of $1,589,-348, reached $26,214,269.91, leaving a deficit for the year of $6,384,786.

FIGURES FROM BROOKLYN

Figures filed by the Brooklyn Rapid Transit Company showed that the rapid transit lines of the company earned $19,562,212.80 during the fiscal year and that the preferential of $3,500,000, operating expenses, taxes, depreciation, etc., amounted to $22,386,406, which left a deficit of $2,824,193, exclusive of the interest charges on the city's investment.

Passenger revenues for the year were $18,842,994, against $15,255,720 for the fiscal year ended June 30, 1919. There was an increase in receipts from advertising and station privileges. Mr. Delaney gave these additional particulars concerning the financial condition of the company:

Operating expenses for the last fiscal year were $11,274,127, an increase over the preceding year of $3,165,974. Maintenance expenses were $2,629,219, an increase of $586,511 over the preceding year. The maintenance account for the year exceeded the contract allowance of 12 per cent of gross revenue by $775,336. The total revenues of the company since the signing of the contract between the city and the company on Aug. 4, 1913, have amounted to $85,996,084 and the total operating expenses have been $39,855,239. Allowances to the company under the preferential of $3,500,000 have been $24,180,107.

Municipal Railway Budget Decreased

Operation of the Municipal Street Railway in Seattle, Wash., for the year 1921 will cost $706,902 less than in 1920, according to the estimates completed by the City Council budget committee. The total cost of operation for the year has been placed at $6,186,910, the Council having cut off only $8,400 from the estimate as prepared by the department. The reduction was effected by eliminating a number of positions which had been asked for. The total sum includes an item of $2,400,000 for wages for trainmen; $394,546 for ways and structures; $618,644 for shops and car houses; $858,744 for interest on bonds, and $660,000 for power.

Gain in Net Income

Surplus Earnings Increase Over $115,000 with a Percentage Change of Nearly 24 Per cent

In a report issued for the year ended March 31, 1920, the United Light & Railways Company, Grand Rapids, Mich., showed a gross earning from all sources of $10,534,834. This was an increase over 1918 of $96,310 or 10.1 per cent. The operating expenses, which also included maintenance and income taxes, were $7,504,084 for 1920. Compared with $6,737,721 in 1919 the increase was $766,363, or 11.4 per cent. Net earnings for 1920 was $3,030,750. This was an increase of $199,946, or 7.1 per cent over 1919.

BALANCE FOR SURPLUS $611,792

After paying all the interest on bonds and notes and dividends of the subsidiary companies' stock, and paying the interest on its own bonds and notes, and dividends on preferred stock, the balance for surplus in 1920 was $611,-792. Compared with $495,070 in 1919 the increase was $116,722, or 23.6 per cent.

From the surplus accounts of subsidiary companies $71,490 was transferred to their depreciation reserve. In addition the subsidiary companies expended, or set aside for maintenance, $730,945. This was charged directly to operating expenses. This made the total amount expended, or set aside for maintenance and depreciation of property, $802,435, or more than 9.8 per cent of the gross earnings. The operating expenses also include $509,539 accrued for payment of general and federal taxes, an increase of $123,779 for the fiscal year.

The statement of earnings contained in the report of the United Light & Railways Company follows:

	1920	1919
Gross earnings, all sources	$10,534,834	$9,568,525
Operating expenses (including maintenance, general, and income taxes)	7,504,084	6,737,721
Net earnings	$3,030,750	$2,830,804
Interest on bonds and notes, subsidiary cos.' due public	$721,274	$720,958
Dividends and earnings on preferred stocks, subsidiary companies due public	170,427	170,824
Profit due minority stockholders	11,299	7,972
Balance	$2,127,751	$1,931,050
Interest on first and refunding 5% bonds, United Light & Railways Company	453,287	435,896
Balance	$1,674,464	$1,495,154
Interest on 6% five-year bond secured gold notes United Light & Railways Company	67,033	90,000
Interest on 6% two and one-half year bond secured gold notes, U. Lt. & Rys. Co., Series "A"	90,000	90,000
Interest on 7% five-year bond secured gold notes United Lt. & Rys. Co., Series "B"	105,000	50,654
Interest on 7% one-year bond secured gold notes United Lt. & Rys. Co., Series "C"	31,556	
Interest on ten-year 6% convertible gold debentures U. Lt. & Rys. Co	120,000	120,000
Interest on commercial loans, United Lt. & Rys. Co.	44,798	42,316
Balance	$1,216,076	$1,102,184
Dividends on first preferred stock 6%	604,284	607,114
Surplus earnings	$611,792	$495,070

Buffalo Reorganization Details Made Public

Company Needs Funds to Make Good Its Operating Deficit and Provide for Renewals and New Construction

Formal notice of the reorganization details agreed upon by the bondholders' protective committee have been mailed to bondholders of the International Railway, Buffalo, N. Y., by Elliott C. McDougal, chairman of the committee and president of the Bank of Buffalo. Chairman McDougal warns that the company has an operating deficit of $2,000,000 and that it is imperative at this time to make immediate provision for funds to meet maturing obligations and for rehabilitation purposes.

IF THE bondholders' committee is obliged to abandon the plan which has been agreed upon, there is danger that the securities of the company will be sold at public auction to satisfy the loans for which they stand, according to Mr. McDougal. In this event, he says, there will be nothing left for distribution among the bondholders.

Can Issue No More Bonds

Chairman McDougal points out to the bondholders that because of the provisions of the supplemental indenture of its refunding and improvement 5 per cent gold mortgage the railway will not be able to issue any additional bonds under the mortgage until its earnings for a period of twelve consecutive months shall have equalled or exceeded approximately $800,000 over all charges ahead of the stock.

It is accordingly imperative to make provision at this time for more than the immediate needs of the railway. In order to make the financial position of the company reasonably safe, Chairman McDougal and the committee estimate that it will be necessary to sell securities sufficient to raise about $3,800,000 and to hold some securities in reserve for possible future needs. Out of a total of $18,325,000 in principal amount, there have been deposited under the protective agreement about $8,100,000 in principal amount of the 4 per cent bonds of the International Traction Company. The committee has decided it will not receive any more bonds for deposit under this agreement.

Will Increase Stock

The committee in its recommendations to the security holders proposes to cause the stock of the railway to be increased from $16,707,500 par value to an amount equal to 95 per cent of the principal amount of the 4 per cent bonds of the International Traction Company which have been deposited under the protective agreement and to exchange all of this stock for voting trust certificates issued under an appropriate voting trust agreement.

The committee proposes to offer to each depositor of a $1,000 4 per cent bond of the International Traction Company, the opportunity to purchase $200 in principal amount of refunding and improvement 5 per cent bonds of the railway for $100 plus accrued interest on such bonds, and also the opportunity to purchase voting trust certificates for nine and one-half shares of stock of the railway for $100.

The committee proposes to sell to underwriters and others at these prices the portions of the refunding and improvement 5 per cent bonds and the voting trust certificates for stock of the railway company which the depositors do not elect to purchase in accordance with the offers to be made to them.

The depositors will be allowed such time after the offers as it shall deem to be reasonable for making elections to purchase the 5 per cent bonds or the voting trust certificates for stock of the price for the bonds will be payable at the time of making the election to purchase. Fifty per cent of the purchase price for the voting trust certificates will be payable at the time of making the election to purchase and the balance thereof at such time or times in 1921 as the committee shall determine. The committee may reserve to sell for account of the purchaser any voting trust certificates upon which any installment of the purchase price is not paid when due, holding such purchaser liable for any such deficiency. The bonds and voting trust certificates are to be delivered upon payment of the purchase price in full.

Property Transfer Planned

After paying and discharging its obligations and expenses, including the compensation of its members, the committee proposes to pay and transfer to the International Railway, or to trustees for its benefit, all cash, securities and other property which may remain in the hands of the committee, including $640,000 in principal amount of underlying first mortgage 6 per cent bonds.

Through the co-operation of a group of Buffalo bankers associated with the Marine Trust Company, the Bank of Buffalo and the Manufacturers & Traders' National Bank, the committee is enabled to make underwriting arrangements at moderate expense which will enable it to sell at the prices above mentioned all of the refunding and improvement 5 per cent bonds and voting trust certificates for stock of the railway, which the depositors do not elect to purchase.

If this plan of readjustment is carried out, it will, in substance, provide each depositor the opportunity to acquire his pro rata interest in the collateral by which the 5 per cent bonds of the International Traction Company were formerly secured, upon his paying his pro rata share of the cost protecting the collateral and rehabilitating the International. In the judgment of the committee, it is the most desirable and equitable plan that is feasible under the circumstances. The financial provisions are no more extensive or burdensome to the depositors than are said to be necessary for the proper protection of their interests.

The railway has been in serious danger of incurring a default under its refunding and improvement gold mortgage, but with the financial provisions and the improvement in management which are now proposed by the committee, it is felt that the future of the railway is reasonably safe.

Operating Deficit $2,000,000

The committee points out that owing to the great increases which have taken place in the cost of operation and the failure of the former management to make adequate reserves the railway has created an operating deficit of $2,000,000. It is recited that the wage advance granted the company's employees absorbed the fare increase and the company now is in need of funds to make good its operating deficit and provide for necessary renewals and new construction.

The committee, Chairman McDougal says, deems it essential to provide for stability of management under the direction of Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, who is a member of the bondholders' protective committee.

Claims of $777,571 Disallowed

The Quebec Public Service Commission has decided against the company in the appeal of the Montreal Tramways from the decision of the Montreal Tramways Commission in the matter of allowing $534,055 to be added to the company's working capital. On Aug. 25, 1919, the Tramways Commission deducted the sum of $534,055 from the amount of the company's working capital. The judgment of the commission read:

> It was resolved that of the amounts of working capital for which interest at the rate of 6 per cent per annum is claimed by the Montreal Tramways from Feb. 10, 1918, to June 30, 1919, the amount of $534,055, representing the reproduction cost of stores in hand, included in the valuation schedule "A," of the contract, be deducted.

It was from this ruling that the company appealed.

Colonel Hibbard, chairman of the Quebec Public Service Commission, who writes the judgment, believes it to be clear that the $534,055 was included at the book value of stores in hand as per the inventory of June, 1917, and that this sum is entered in the total sum of $36,286,295, the allowed capital value of the company's system. The company contended that the sum of $534,055 should have been allowed it as working capital.

The Quebec Public Service Commission has also rendered judgment in another appeal of the tramway against a judgment of the Montreal Tramways Commission, which had disallowed a claim of the company to have accounts totalling $243,516 credited for the 6 per cent.

Lessee and Lessor at Odds in Philadelphia

Mr. Mitten's Plan for Simplification of Corporate Structure and Economies Opposed by Underlying Holders

Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, has resigned as a director of the Union Traction Company, operated under lease by the P. R. T. Lessee and lessor company appear to be at odds, with Mr. Mitten of the opinion that the leased company seeks to impose burdens on the operating company that are far too exacting. On the other hand, officials of the Union Traction Company have thought that Mr. Mitten was aiding the effort to reduce the rentals paid by the company to the underlying corporations, of which the Union Traction is the largest.

JEREMIAH J. SULLIVAN, president of the Union Traction Company, has sent the following letter to Mr. Mitten:

In view of the persistent rumors that the Philadelphia Rapid Transit Company is aiding or at least in sympathy with the attacks on the rentals of its underlying companies, we write to ask you if you will not contradict these rumors.

We would like to know also if the Philadelphia Rapid Transit Company has any intention of trying in any way to cut down the rentals payable to the Union Traction Company under the lease of July 1, 1902, or would in any way aid or sympathize with any such attempt to reduce the rentals so payable to this company.

Under the terms of the agreement of 1902 the Union Traction Company must give its assent to any financial measures advanced by the operating company. In pursuance of the agreement the Philadelphia Rapid Transit Company sought the consent of the Union directorate to the floating of $6,000,000 car trust certificates. The Union Traction, in replying, stated that it would consent only if the P. R. T. would transfer the ownership of every available security that it has or ever will get. Among the demands of the underlying company were:

That a new contract be entered into which would safeguard every right the Union Traction possessed. In that agreement it wished to obtain ownership of all the near-side cars that still remain in the possession of the P. R. T.

That all the interest the P. R. T. has in the Motor Real Estate Company, amounting to $4,000,000, should be transferred to the Union Traction and that every interest the company now holds should be handed over to the Union Traction Company before it agrees to the necessary car-trust certificate issue.

Among the assignments mentioned are those of all the company holdings in the Willow Grove Park Company, the Chester & Philadelphia Railway Company, the Continental Passenger Railway and others.

In addition the Union directors sought to have the P. R. T. sign over all its real estate holdings and all that it might acquire. On none of the assets thus turned over was the P. R. T. to secure a loan without an approving resolution by the underlying body of directors.

Mr. Mitten in return submitted a proposal for the consolidation of the four principal underlying companies with the P. R. T. into one compact body. Under the plan of consolidation drawn up by Mr. Mitten the fixed charges of the company would be reduced from $11,000,000 approximately to $6,000,000. However, that plan entailed an assessment of $10 on every Union Traction stockholder for every share he held. That proposition was voted down and Mr. Mitten, after scrutinizing the terms under which the Union Traction would give its consent to the loan, submitted a counter proposition.

Mr. Mitten later wrote a letter in which he offered to make over to the Union Traction the real estate and stocks of the underlying companies that the P. R. T. owned, and also agreed to sign over the 500 cars that the P. R. T. had bought since 1902 when the lease was promulgated. He, however, refused to hand over the ownership of the Chester & Philadelphia Railway or the holdings in Willow Grove Park. The ownership of the bonds of the underlying companies Mr. Mitten desired to keep for use in future financing of the company. In conclusion, Mr. Mitten wrote that he had not joined in the attack on the underlying company rentals, nor would he do so as long as he had the co-operation of the Union Traction Company.

The Union Traction directors flatly rejected the counter-proposal on the ground that it did not conform with their requests.

In withdrawing from the Union Traction Company Mr. Mitten wrote to Mr. Sullivan in part as follows:

I am not, and never have been, in sympathy with Union's policy of exacting P. R. T.'s equities as the price of Union's consent when required to secure additional capital to be spent upon the leased property; but, on the contrary, have repeatedly stated to your board my belief that Union's stability depended largely upon Union's strengthening its lease.

Union's latest demand that, as the price of its consent to the proposed $6,000,000 car trust, P R. T. shall give to Union every equity that P. R. T. now possesses, and in addition agree to make over to Union all property which P. R. T. may hereafter acquire, is both unreasonable and destructive.

I do not relinquish the hope that Union may yet see that its own, as well as the interests of the public and of P. R. T., will be best served by the adoption of a different spirit toward the transit problem—a spirit to which the accompanying plan is a tentative effort to give formulated expression. Nevertheless, my now continuing to act as a director of Union would be embarrassing, and I therefore desire to make my resignation, herewith tendered, effective forthwith.

In the full text of his proposal Mr. Mitten points out that under his plan the fixed charges of the new company would at the outset be $5,000,000 a year, as against the present charge of nearly $10,000,000. He says that credit is at once established by this change and the way opened to a further consolidation and the issuance of a general first and refunding mortgage by which securities of underlying companies could be retired and the capital needs of the operating company provided for. On the matter of leases and their value, Mr. Mitten says:

All the lease-holding companies would do well to bear in mind that, as their existence is dependent on leases, so the value of those leases is dependent on the ability of the company operating the physical properties to make them profitable. This applies with equal force to all of the five companies, and, in fact, unless an individual property is such that the real owner of that particular property can see clearly that he can operate his own property on a paying basis, in case it were returned to him, it is equally to his interest to see that the operating lessee is successful and to assist his lessee by every means in his power.

PROPOSED NEW UNDERLYING TRACTION COMPANY UNDER MITTEN CONSOLIDATION PLAN—CAPITALIZATION AND RETURN

		Stock of New Company	Rate	Dividends, Amount	Capital Paid In	Surplus
People's Traction / Electric Traction	1st pf.	*$14,865,057	8%	$1,189,204.56	$6,000,000 / 8,297,920	.....
Philadelphia Traction	1st pf.	20,000,000	8%	1,600,000.00	20,000,000	$486,220
Total first preferred stock.		$34,865,057		$2,789,204.56		
Union Traction	2d pf.	30,000,000	7%	2,100,000.00	10,500,000	3,753,141
$10 per share assessment		.....		.....	6,000,000	.....
Philadelphia Rapid Transit com.		.....	$2.50	.....	.....	.....
600,000 shares		No par value	a share	1,500,000.00	30,000,000	4,482,120
		$64,865,057		$6,389,204.56	$80,797,920	$8,721,481
Total paid in capital and surplus						$89,519,401
Preferred stock of new company						64,865,057
Equity of common stock (for P. R. T. equals $41.09 per share)						$25,654,344

Note—
8% on $89,519,401 capital and surplus allowed before Federal tax is $7,161,552.08
Dividends on stocks of all five companies would only be 6,389,204.56
Leaving additional earnings permitted before Federal tax applies of $772,347.52

* Takes the place of $29,730,114 E. and P. 4s.

Permission of the Public Service Commission to withdraw the fare-increase petition now before it will be sought at once by the Philadelphia Rapid Transit Company. That was announced on Aug. 17 by Mr. Mitten. From the offices of the railway the following statement was made:

Mr. Mitten today announced that the P. R. T. will at once petition the Public Service Commission to withdraw the application for fare increase now before the commission, and that he would notify the Mayor and city solicitor accordingly.

Earlier in the day Mayor Moore had said:

It is a question of reducing the underlying rentals or increasing the fares.

In view of the handicap under which the Rapid Transit Company is laboring, I do not see how it can get along without higher fares. The people want better service, better cars and better equipment generally.

In addition to the problem of satisfying these wants, the company is greatly handicapped by the excessive underlying rentals. Therefore something very definite will have to be done to increase the company's income.

Financial News Notes

$85,000 of Bonds Authorized.—The Public Utilities Department of Massachusetts on Aug. 10 authorized the Holyoke Street Railway to issue bonds to the extent of $85,000 to mature in April, 1935. They will bear interest at 6 per cent. The new issue is put out to retire another which matures this year.

Southern Road Decreases Capital.—Notice of a decrease in the capitalization of the Alabama City, Gadsden & Attalla Railway Company, Gadsden, Ala., has been filed with the Secretary of State. In this notice the company stated that its authorized capital stock had been cut from $330,000 to $6,600.

Resort Line to Reopen.—Service will be resumed by the Southwestern Gas & Electric Company, operating the electric railway system in Texarkana, Tex., and Texarkana, Ark., on its line to Spring Lake Park. The park, formerly owned by the company, has been sold to the city. Operation of the line was discontinued several years ago.

Refunding Operation Approved.—An order by the California Railroad Commission authorizes the Pacific Electric Railway, Los Angeles, to issue bonds to the amount of $200,000 to refund bonds of the Riverside & Arlington Railway, which is now part of the Pacific Electric system. The bonds are owned by the Southern Pacific Company, which is willing to accept Pacific Electric bonds in payment therefor.

Texas Road Ordered Sold. — The Bryan - College Interurban Railway, operating from Bryan, Tex., to College Station, where the Texas Agricultural & Mechanical College is located, a distance of about 6 miles, has been ordered sold at public auction by Judge J. C. Hutcheson of the Southern District of Texas at Houston. The line has been in receivership for some months. The sale will be made by Guy Graham, Houston, on Sept. 8.

San Francisco May Vote on Railway Purchase.—The people of San Francisco, Cal., are to be asked to vote next November on the proposal that the city purchase the United Railroads, if the decision reached by the public utilities committee of the Board of Supervisors on Aug. 11 is carried out. The appraisal of the properties is yet to be made. The city attorney has been asked to draw up the charter amendment which would be a prerequisite to the proposed purchase.

Purchase Plan Promoted. — The Chamber of Commerce of Bloomfield, W. Va., has agreed to promote a plan of the Princeton Power Company to take over the electric railway system of the Appalachian Power Company in Bluefield and Graham, Va., and own and operate it in the future. The Princeton company will put the deal through providing the people of the city subscribe for $50,000 of preferred stock. This money would be utilized at once in the rehabilitation of the present system by providing immediately better cars and improving the roadbed.

Birmingham Plans Railway Survey.—A preliminary survey of properties of the Birmingham Railway Light & Power Company, Birmingham, Ala., as a basis of negotiations for a re-organization of the company has been authorized by the City Commission. The work will be done by I. W. Ross, consulting engineer for the city. At this time no attempt will be made at an actual appraisal of the properties. The commission instructed the engineer to make a survey of the properties and present a report to serve as a basis on which the city may start negotiations looking toward the working out of its plan.

May Seek to Stop Operation.—Announcement has been made by City Solicitor H. G. Pratt of Martin's Ferry, Ohio, that the city will not attempt to stop cars of the Wheeling Traction Company following the expiration of the company's ordinance, as the ordinance which repealed the franchise under which the company is operating contains a provision that the company may have twenty days in which to remove all equipment from the city. After the expiration of twenty days the city, it is expected, will file a petition for injunction proceedings in the courts, if the company has not complied with the provisions of the ordinance by that time.

Bids Asked for Bonds for Sinking Fund.—Holders of the first and refunding sinking fund mortgage twenty-five year 5 per cent gold bonds of the Denver (Col.) City Tramway have been notified that, on Nov. 1, the company will pay 1 per cent of the principal of the bonds issued and outstanding and the annual interest on all bonds purchased for the sinking fund, amounting to not less than $154,365 to be used for the redemption of bonds for the sinking fund. Sealed proposals for the sale of the needed bonds to exhaust the sinking fund will be received by the Bankers Trust Company, New York, on or before Aug. 24 and those offered at the lowest price, not exceeding par and accrued interest with a 5 per cent premium, will be paid.

Massachusetts Road to Be Sold.—The Board of Trade of Canton, Mass., has declined to entertain a plan to buy the property of the Blue Hill Street Railway in that town and operate it by public subscription. The Board of Trade felt that it would cost too much to buy the line, rehabilitate it and purchase new cars. It is understood to be the intention of the Canton citizens to organize a motor bus line. The Selectmen of Milton have been notified of the intention of the receiver of the Blue Hill company to sell it for junk. It is said that the buyers of the property are to pay about $59,000 for the Blue Hill Street Railway rails in Milton, Canton, Stoughton, Sharon, Norwood and Readville, about 18 miles in all. Perry, Buxton & Doane are the prospective purchasers.

Wages Increased in Asheville.—Arbiters in the wage controversy between the Asheville Power & Light Company, Asheville, N. C., and its trainmen have granted the men wage increases amounting to approximately 29½ per cent. The award was accepted mutually, owing to a previous agreement to leave the decision entirely in the hands of a board of arbiters composed of W. O. Wolfe, Jr., appointed by the men; W. C. Hopson, New York City, appointed by the company, and W. G. Fortune, an attorney of Asheville, appointed by both factions as umpire. The new scale is as follows: First six months' service, 48 cents an hour; second six months, 49 cents an hour; third six months, 50 cents an hour; fourth six months and thereafter, 56 cents.

Valuation Preparatory to Purchase by City.—A hearing was held on Aug. 4 before the Public Service Commission of New Hampshire involving the making of an appraisal of the Exeter, Hampton & Amesbury Street Railway to determine the fair value of the railway with a view to its acquisition by the town of Hampton. The railway about two years ago was authorized by the commission to abandon a certain portion of its lines provided the towns did not, prior to a date set by the commission, agree to the purchase of the railway or decide to enter into a contract with the railway under which service could be continued without loss. The Town of Hampton and the railway have since been in negotiation, with a view to the sale of the property to the town, but the negotiations were terminated upon the failure to reach an agreement.

Car Trust Certificates Offered.—Cassatt & Company, New York and Philadelphia, are offering for subscription at 100 accrued dividend to yield 8 per cent $1,000,000 of Northern Ohio Traction & Light Company car trust 8 per cent gold certificates. These certificates are issued under the Philadelphia plan with the Fidelity Trust Company, Philadelphia, as trustee. They are dated Aug. 1, 1920, and mature serially to 1925 on the rate of $100,000 every February and August. The equipment under the trust will be leased by the trustee to the Northern Ohio Traction & Light Company, Akron, Ohio. It will consist of twenty steel interurban passenger cars, fifty-six Peter Witt city passenger cars, and ten Cleveland type passenger trail cars, fully equipped being built by the G. C. Kuhlman Car Company, Cleveland, Ohio, at a total cost of more than $1,340,000. The total cost of the equipment will, therefore, be more than 33 per cent in excess of the face value of the car trust certificates to be issued.

Traffic and Transportation

Rates May Be Changed

Supreme Court of Iowa Holds That Rates Fixed by City with Local Utility Are Not Binding

The Supreme Court of Iowa has ruled that a contract between a city and a railway which fixes a permanent fare has never been sanctioned by the Legislature of Iowa and that therefore rates fixed in such a contract may be changed.

The decision was rendered in the case of the appeal of the Ottumwa Railway & Light Company from the ruling of the lower court which denied the company an injunction restraining the city of Ottumwa from reducing the fare from 6 cents to 5 cents, the higher figure having been granted as an emergency measure during the war period.

Ends Long Court Fight

In April, 1919, the City Council of Ottumwa, which previously had allowed the higher fare, passed a resolution ordering the Ottumwa Railway & Light Company to return to its former rate of 5 cents, declaring that the ending of the war had made unnecessary the continuance of a 6-cent fare. The railway then secured a temporary injunction from the District Court at Ottumwa restraining the city from interfering with the collection of the 6-cent fare. When the case came up for hearing on the permanent injunction Judge Cornell sustained the motion of the city to dissolve the injunction. The case was then appealed to the Supreme Court of Iowa.

The opinion in the higher court was written by Justice Ben I. Salinger. It has the added strength of receiving the unanimous concurrence of all members of the Supreme bench. Justice Salinger held that the case proceeds on the general theory that it is against public policy to contract for unchanging rates, that there must be no such contract because its enforcement might on the one hand fasten what proves to be an exhorbitant charge upon the patrons, or on the other prove a rate that will confiscate the property of the service corporation. The decision runs on the broad ground that public policy forbids such contracts unless the Legislature, the ultimate judge of what is public policy, declares unmistakably that such contracts do not offend that policy.

State's Power Sovereign

Later in the week weight was lent the decision of the Supreme Court by a ruling of Judge Martin J. Wade of the Federal Court in his hearing upon the petition of intervention brought by the railway union of Des Moines. Judge Wade discussed the Ottumwa case and stated that it was fundamental that a State has the power to enact constitutional laws and that the State has the power through the courts to construe these laws. United States courts, he added, always yield their views to the highest tribunal of the State when statutes of that State are construed.

Can Fix Emergency Rates

Judge Wade did not state definitely wherein lies the power to fix rates, but throughout the opinion there was an implication that the City Council could and should order a temporary change when such an emergency as the Des Moines case was concerned. While he held that it is without the province of a judge to determine fares he also stated that a judge could prohibit the enforcement of a rate which did not provide for the payment of the interest on the investment.

Court Orders Memphis Rise

As the result of an order issued by Federal Judge Andrew M. J. Cochran on Aug. 16, a 7-cent cash fare was scheduled to go into effect on the lines of the Memphis (Tenn.) Street Railway on Aug. 18. The company was directed to sell ten tickets for 65 cents. Judge Cochran refused to hear further arguments in support of the continuance of the 6-cent fare, holding that the matter had been decided by Federal Judge John E. McCall, since deceased. Judge McCall had ruled shortly before his death that the 7-cent fare should become effective on Aug. 15.

The abandonment of the 6-cent fare followed the report of the receivers of the company on the results of operation during the three-months trial period proposed by Judge McCall to determine the extent of the company's needs. Under an order issued by the State Railroad and Public Utilities Commission the company was to have begun charging a 7-cent fare on April 1. The court secured a postponment of the rate increase in the hope that a 6-cent fare would prove adequate.

The report of the receivers for the trial period of three months showed that the company was running behind and could not continue to operate at the 6-cent fare. Judge McCall, before authorizing the rate increase, signed an order under which wages of the company's employees were raised to a maximum of 57 cents an hour. The wage rise will entail an additional expenditure on the part of the company of $150,000 annually. The report of the receivers showed expenditures for the three months of $831,854, with revenues of $823,918.

Key Route Needs More

Oakland Company Asks California Commission for Another Increase to Meet Wage Rise

The San Francisco-Oakland Terminal Railways, Oakland, Cal., has applied to the Railroad Commission for an order readjusting its passenger fares between San Francisco and Alameda County points. Application is directed exclusively to the interurban trans-bay service in what is known as the "Key Division." It does not involve the "Traction Division" which operates between points in Alameda County and Contra Costa County. The company asks the commission to grant a rate substantially in excess of the amounts granted by the Interstate Commerce Commission. It declares that a one-way fare of 18 cents, such as is provided by the Interstate Commerce Commission in its recent order, would be cumbersome and impracticable to the Key Route and to the public.

Deficit of $710,550

In a statement accompanying the application, the company contends that for the thirty months ending June 30, 1920, there has been a deficit of $710,550. The deficit for the six months ending June 30, 1920, is given as $64,928. The results of the two rate increases granted the company by the Commission, one in June, 1918, and the other in September, 1919, are outlined as follows:

Six months ending December 31, 1918, as compared with the same six months of 1917, gross operating revenue increased $76,588; actual operating expenses increased $118,442.

Six months ending June 30, 1919, compared with the same six months of 1918, gross operating revenue increased $106,196; actual operating expenses increased $147,688.

Six months ending December 31, 1919 (which included the second rate increase) compared with same months for the year 1918, gross operating revenue increased $130,918; actual operating expenses increased $67,212.

Six months period ending June 30, 1920, compared with the same six months of the year 1919, gross operating revenue increased $135,407; actual operating expenses increased $109,381.

Gross Operating Revenue Raised

The company asserts that during the twenty-four-month period in which the higher rates have been collected, the increase in gross operating revenue totaled $499,111. The total increase in actual operating expenses was $443,325. To the total expenses the company contends should be added a State tax of 5½ per cent on the increased gross operating revenue amounting to $26,203, and actual cash set aside in depreciation fund in accordance with the commission's orders aggregating $75,262. According to these figures there has been a net decrease, therefore, of $45,580. It is estimated by the company that increased wages of train men will amount to $1,835 a month, in addition to the figures given above because of increases effective June 30. The men are now receiving a maximum of 59 cents an hour as against the former maximum of 54 cents.

Jitneys Still Hold Sway

Bridgeport Situation Unchanged Except for Growing Realization That Jitneys Do Not Meet Transportation Demand

Trolleyless Bridgeport, the second largest city in Connecticut, is going about its daily work as usual. More than 170,000 people are dependent for transportation on the jitneys and on private autos. But public opinion is not a unit as to how well the jitneys are functioning. Not by any means. The jitney men and an individual here and there will tell you that all is well, but the merchants and others declare that the salvation of Bridgeport lies in the return of the trolleys.

WITH Bridgeport thus divided against itself, the Connecticut Company remains silent. It is content to wait, as it said at the beginning it would. The Council also appears to be content to wait. The court in its recent decision suspending the jitney regulatory order pointed out wherein the measure was defective. That was its only province. The Council, however, has done nothing since toward amending the measure so as to meet the court's idea. The members apparently have their ears to the ground, and as soon as indications take on a permanent hue it is expected they will act.

Merchants Change Their Tune

At the start the merchants in Bridgeport appeared to be indifferent to the passing of the trolley. They were, however, among the first to protest against the present arrangement and the no-parking rule. Their trade which came by trolley soon began to fall off considerably and the no-parking rule killed much of the patronage which drove downtown in its own autos. Protests about the latter were so loud that on Aug. 16 the Aldermen fixed a twenty-minute parking limit on eleven business streets. The Mayor in recommending the measure said that the business men had appealed to him for greater leeway in the matter of parking. The passage of this measure, however, solves only half the problem of the merchants. It doesn't bring back to the business man the patron who formerly used the trolley and now apparently refuses to shop via the bus. Where this man or woman is now shopping is a conundrum. Some say the trade has gone to the shops in the local community where the individual lives. Others say it has been lost to Bridgeport entirely.

Jitney Men Pleased

As for the jitney men they appear well pleased. Their own opinion is that they are serving the city well, but that there is still some room for improvement. In consequence, rumors are heard of plans to incorporate a bus company for unified service. As a fancy this is a bright idea, but it doesn't appear to appeal very strongly to the itinerant operator who skims the cream of the traffic during the rush hours, night and morning. Nor does the proposal have much compelling power in the face of the fact that the Council may act at any time in line with the court's suggestions and in deference to public demand curb the jitneys.

The average number of jitneys in service is about 425. It is true that the withdrawal of the trolley cars has relieved congestion by making it possible for jitneys to operate two abreast, but it is hardly true that the average rider in Bridgeport enjoys the degree of comfort that he did when both jitneys and trolleys were in use or that he would enjoy under a combined system of trolleys and jitneys properly regulated and articulated.

These statements are general. They are intended to be general. They do, however, present the case as it rests at present. Business men and merchants to whom they were submitted by a representative of this paper who was in Bridgeport on Aug. 19 agree that the conditions were set forth correctly. The merchants generally were very willing to talk, but they were unwilling that their identity should be disclosed. Manufacturers were also inclined to adopt a similar attitude, although some of them did consent to having their names mentioned.

Jitneys Have Injured Trade

The merchants are sure that the jitneys have hurt their trade. It had been suggested from an outside source that perhaps the buying movement in Bridgeport had fallen off on account of a general slump in trade, but the quietus was given to this by a merchant who proved that some of his charge customers were opening accounts elsewhere, notably in New Haven, and in some instances in New York. Here is how a merchant employing 500 people summarized the situation:

> The jitneys are not desirable for the shopper. They are not as commodious as the trolley and the drivers object to bundles. Factory people seem satisfied with the quick service which the jitney renders. Customers complained by letter of their inability to shop conveniently. Finally the company agreed to take telephone orders. This is a practice it had steadily sought to discourage because telephone orders run up delivery costs. There has been no appreciable increase in lateness. Jitney service in the morning seems to be adequate. Employees have complained, however, about difficulty in getting home at night. People on the outskirts find transit difficult. The attitude of the trolley company is wrong.

A merchant with 100 employees said in substance:

> The loss of the trolleys has certainly hurt trade. The present nondescript bus service doesn't appeal to the better class. The buses move faster, but the annoyances to which one is subjected in traveling in them more than outweighs the advantage of speed. Factory men have agreed in a straw vote that the jitney was the thing, but sentiment is changing, due to the pressure of the women members of families who object to riding in the public autos. The jitneys have done better than I expected they would. The city has undoubtedly suffered in the past because of inadequate transportation. The bus and the trolley services should be co-ordinated. If the matter had been put to a vote when the trolleys were withdrawn 90 per cent of the people would have favored the jitneys. Sentiment, however, is gradually changing.

Another merchant with 450 employees said he was sure the all-jitney service had hurt trade. He cited the credit instances referred to previously. In substance he said:

Mid-day Jitney Service Poor

> Jitney service is poor in the middle of the day. Both the jitneys and trolleys are needed. There should be trolley service from each end of the city with a loop in the central district, and a charge should be made by the railway for a transfer that will carry passengers from one end of the city to the other. Lateness is "a state of mind." Those who have been late on and off for years still come in late. The jitneys have made few recruits in this respect. The trolley had reached a low estate. It had not met the local needs. Since the trolleys were withdrawn this house has advertised the fact that telephone orders will be accepted. Mail order business has been solicited recently.

By careful study this man was able to estimate probable sales within 5 per cent. For reasons of his own his July and August budgets had this year been bunched, but receipts were running 25 per cent behind the estimate. The big falling off had occurred since the trolleys were withdrawn.

Another merchant employing sixty-five people had recently had two very big weeks. He said substantially:

> Our good record was due to large advertising of our anniversary sale. The best trade will not ride in the jitneys. The trolleys are needed. There is no doubt about that. They have not, however, fully met the transportation needs of the community.

A plant in the outlying section employing 2,500 to 3,000 people, mostly women, was visited. The trip out there was made by jitney just after the noon hour. Bus after bus passed fully loaded. Finally one was boarded on which it was possible to obtain standing room. The ride was made at great personal discomfort to the writer. Standing in a trolley car is one thing. Standing in a jitney is something entirely different. The speaker at the plant visited was the supervisor of employment. He was suggested by the head of the company as being better informed, perhaps, than anybody else. He said:

Neither Service Alone Sufficient

> Two jitney lines run near the plant. There has been no noticeable increase in lateness on the part of the employees since the jitney has been the only means of service. The workers took "pot" luck in getting home. In this respect neither the jitneys nor the trolley has met the demand of the employees for adequate transportation. We should have the trolleys back, but the trolley and the jitney service ought to be co-ordinated. A more intelligent attitude on the part of the trolley management is needed. The trolley company was certainly behind the times in the accommodations it offered.

E. Norton, manager of the Connecticut Clasp Company, did not object to the use of his name. The plant of which he is the head employs only seventy-five people, but he had given considerable thought to the matter of transportation. His sympathies were decidedly with the trolley company. Mr. Norton knew costs. His brief talk showed this. His help was getting

twice as much as before the war. Practically all commodities had doubled in price and he thought that the trolley was entitled to the advance in fare which had been put into effect. He also thought the present jitney service was doomed. He said, however, that he would like to see a well regulated jitney service installed to supplement the railway. Bridgeport was a workingman's town and the traffic peaks were unusually severe. He did say, however, that his help appeared to be handled just as expeditiously as before the trolleys were withdrawn.

Nondescript Service Unsatisfactory

The employment head of another plant with 2,500 persons said that there had been no general complaint of lateness on the part of employees since the trolleys had been withdrawn. He patronized the jitneys himself. Women at the plant had complained of crowding. He regarded most of the drivers as not qualified for their jobs and said they were not the type of men whose appearance inspired confidence. Weather conditions had favored the jitneys. He doubted whether they would be able to keep up the present pace under conditions of climate less favorable.

The welfare superintendent of a plant employing 1,500 said the proportion of those arriving late had increased slightly since the trolleys had been withdrawn. The service to the west end where this plant is located had not been satisfactory and it had been necessary to jack up the jitney association in the matter of service. The speaker used his own auto in travelling to and from work.

In the case of a plant employing about 2,000 the welfare superintendent said that most of the employees lived within walking distance. He was not optimistic as to the future of the bus service as at present managed.

Personal observation on the part of the writer established, so far as a limited survey could, the fact that service by jitney in the morning was fairly reliable and satisfactory. Conditions in the middle of the day, in so far as they come to the attention of the writer, were intolerable. In this regard they substantiate the claims of the merchants that women shoppers of the class upon whom the merchants are mainly dependent for their sales are conspicuous by their absence. Conditions in the evening are deplorable. Mr. Schwartz, the head of the jitney men, ascribes this to the fact that the general hour for closing in Bridgeport is 5 o'clock and that transportation must be furnished at one and the same time for shop help, employees of the stores and for the bulk of the traders who do their shopping down-town.

Police Reticent

The superintendent of police refused absolutely to discuss the jitney problem. Personal observation established the fact, however, that a very efficient traffic system has been worked out, five policemen being used at each of several of the important crossings during the rush hours. The system reflects great credit on Traffic Superintendent Walker.

Mr. Schwartz, who heads the jitney men, has lived in Bridgeport many years. He was formerly a mechanic in one of the shops there. He is now in the auto business with his brother. Literally and metaphorically he is the hardest man in Bridgeport to find. Interviewed after the rush hour peak on Aug. 19 he said there were 425 jitneys, each seating from twelve to sixteen persons. This is about the same number as before the trolleys were withdrawn.

With the trolley cars out of the way, however, the service had been speeded up greatly so that in the matter of accommodations conditions were improved considerably. Few buses run all night. Regular service commences at 5:30 a.m., and continues until 1 a.m., with a decreasing number of cars during the middle of the day and in the evening. Runs are assigned with the mutual consent of the bus drivers. Mr. Schwartz looked upon the withdrawal of the trolley service as an attempt on the part of the Connecticut Company to discredit the buses by proving their inability to cope with the traffic situation which the withdrawal of the trolleys created. He was sure that in this the Connecticut Company had failed. The bus men have plans of their own for organizing service or services with autos more commodious than those now in use, but funds for carrying out such plans can not be raised until the rights of the jitney have been properly established by suitable ordinances and at law.

Brief Notes on Other Cities

In the other cities in the state the jitney menace has taken on other and varied aspects. If a proposal made by Thomas F. Moore, secretary of the Chamber of Commerce of Waterbury, is adopted, the city will rely solely upon the trolley. That body, through its transportation committee, has just filed an elaborate survey of the local situation with the Board of Aldermen, who have adopted the recommendations and passed an ordinance restricting the jitneys from operating on streets now served by the electric railway.

As far as the city of New Haven is concerned representatives of the Connecticut Company and of the jitney operators were heard there recently by the Board of Aldermen. The committee of that body will consider the facts brought out at the hearing and then draw up a report for presentation to the full body.

Two reports on the jitney have been made to the aldermen of Hartford. Both have been referred back to the committee of that body for further consideration.

The statement was made in one of the New Haven papers a few days ago that the Connecticut Company proposed to engage extensively in the jitney business, but this President Storrs of the company denied.

Traffic Moving Faster

Anti-Parking Legislation Has Marked Effect on Electric Railway Service in Kansas City

Beneficial results have followed the enactment by the City Council of Kansas City, Mo., of an ordinance regulating the parking of vehicles within the downtown business district. The measure was passed late in May. Patrons of the Kansas City Railways now find that their daily rush-hour trips are shorter by from ten to fifteen minutes than formerly. More time is saved owing to the shorter headway under which the cars are run.

Rush-Hour Parking Barred

The parking ordinance provides that vehicles shall not be permitted to stand on any of the main streets in the business section between the hours of 7 a.m. and 7 p.m., except for such time as is necessary for the reception and discharge of passengers and freight. This section, in general, includes the territory bounded by Seventh Street, Thirteenth Street, Baltimore Avenue and McGee Street, making the district approximately six blocks north and south and five blocks east and west.

The parking law partially eliminated the causes for delay and congestion, but affected the situation very little during the morning and evening rushes. The great number of jitneys stopping every block to take on and unload passengers caused much more inconvenience and jam than all of the other steadily moving traffic put together. In an effort to remedy the situation the City Council recently passed an ordinance routing the jitneys so as to circle the congested district. All jitneys are now moving north on McGee Street to Seventh, west on Seventh to Baltimore Avenue, south on Baltimore Avenue to Thirteenth Street and east on Thirteenth. It has been estimated that this relieves from 35 to 50 per cent of the congestion.

Mr. Buffe Pleased

In commenting on the effects of the new legislation, F. G. Buffe, general manager of the Kansas City Railways, said:

More Car Riders

The combined effect of the parking and loop ordinances has made a marked difference in the quality of service which we are able to give. We find that all cars are running on schedule and that we are maintaining our headways on time, where it was almost impossible before to get a car through. Our speed has increased more than 100 per cent, and although it is too early to estimate with a very great degree of accuracy, it looks as though our receipts were going to give favorable indication of the change.

There is not as much use of the private automoblie as formerly, as many are leaving them at home rather than go to the trouble of observing the parking regulations, and the jitneys have felt the effect of the "loop" in a falling off in the number of patrons. People are unwilling to walk farther to take a jitney or a street car when operating under normal conditions.

Efforts are being made by the Kansas City Jitney Association to have the "loop" ordinance repealed and a substitute measure introduced.

Minneapolis Fares Up

Ordinance Granting Company a Six Cent Fare Becomes Effective—St. Paul Men Plan Strike

An ordinance granting a 6-cent fare to the Minneapolis Street Railway took effect on Aug. 16. The measure was passed by the City Council on Aug. 6 and became a law without the signature of Mayor Meyers. The company accepted the ordinance on Aug. 13. Tickets are to be sold at convenient places, such as drug stores, but not on the cars. On Dec. 15 the fare will advance to 7 cents with six tickets for 25 cents.

The trainmen of the St. Paul City Railway served notice on the City Council that unless the Council took immediate action to increase fares they would strike at 5 a.m. on Aug. 21. E. W. Bemis has been wired to come from Chicago to make some sort of a report on the progress in the physical valuation of the company's property to determine whether an advanced rate of fare is warranted. The company will endeavor, in case of a strike, to operate the cars through voluntary service.

Minneapolis Walkout Averted

Had the Mayor vetoed the bill the trainmen's strike set for July 1, but postponed through formation of an arbitration board, would have been effective on Aug. 14. As it is employees of the company are to receive back pay from July 15 on the basis provided by the arbitrators. This means that about 2,000 men will get about $65,000.

Horace Lowry, president of the company, said:

> We expect to fulfill every promise to the arbitration board, the Council, city officials and the public. The time required to restore the 1917 service, in accordance with the provisions of the arbitration board's report, will depend entirely upon how soon we are able to fill up the ranks of our employees. We are beginning under a handicap because we are already short of the required number. We are hopeful however, that the new wage schedule will promptly furnish more employees, and these will be put to work re-establishing the service.

Under the new schedule the men instead of working on a ten-hour basis will work nine hours. They will receive 60 cents instead of 50 cents as maximum hourly pay, will obtain back pay for thirty days, will be allowed twelve holidays with pay each year and will be paid 70 cents an hour for overtime. Forty per cent of the shifts will be completed in eleven hours, 20 per cent in twelve hours and 40 per cent in thirteen and one-half hours. The men will be paid $5.60 a day for nine hours hereafter, while heretofore they received only $5.17 for ten hours.

Bus Franchise Sought in Tacoma

Representatives of a new company of bus drivers have asked the City Council of Tacoma, Wash., for a franchise to operate over the city streets. Four men plan to form a concern, capitalized at $40,000 to $50,000, to operate a number of twelve to twenty passenger buses on from two to four main arteries of the city.

In return for a franchise which will free them from cut-throat competition, the new company will guarantee fixed service in heated, pay-as-you-enter cars. Cash fare will be set at 10 cents with tickets at a lesser figure. To enable them to finance the proposition the City Council will be asked to give a franchise for a number of years.

Mayor Riddel and Commissioner Shoemaker state that no wild-cat jitney system will be tolerated. Bus drivers will be required to be bonded. A definite system of operation will be outlined before the cars are allowed on the city streets.

Transportation News Notes

Ask Ten Cents in Berlin.—The Berlin (N. H.) Street Railway has applied to the New Hampshire Public Service Commission for authority to charge a 10 cent fare. The company proposes to sell twelve tickets for $1.

Fare Raised in Augusta.—The Maine Public Utilities Commission on July 29 granted authority for a 9-cent cash fare or six tickets for 50 cents to the Androscoggin & Kennebec Railway, Augusta. The company had petitioned for a 10-cent fare.

Fare Advance Brings Revenue Rise.—The revenue of the Shawnee-Tecumseh Traction Company, Shawnee, Okla., has increased 25 per cent since the company began charging a 7-cent fare on June 1. The fare was formerly 5 cents.

Will Protect Carmen from Weather.—A bill has been introduced in the lower house of the Georgia Legislature requiring electric railways operating within the State to close in the ends of cars in winter to protect carmen from inclement weather. The proposed measure has been reported favorably by the committee on railroads.

Tokens on Georgia Line.—Metal tokens are now being used on the lines of the Augusta-Aiken Railway & Electric Corporation of South Carolina, Augusta, Ga. Fifteen tokens are sold for $1.05 and thirty for $2.10. The State Railroad Commission some time ago authorized the company to raise its cash fare from 6 cents to 7 cents.

Open Cars in Connecticut.—Open cars are again being operated on the lines of the Connecticut Company, New Haven, Conn. These cars were temporarily abandoned a year ago when the zone plan of fare collection was installed. Under the 7-cent flat fare regime now in force the use of this type of equipment is made possible once more.

Crosstown Fare 10 Cents.—The Massachusetts Department of Public Utilities has authorized the Union Street Railway, New Bedford, to discontinue the charge of 2 cents for each transfer. The company was given permission to charge a 5-cent fare to the center of the city and a 10-cent fare from one side of the city to the other.

Ten Cents in Regina.—Seattle is not the only city whose municipally-owned traction system has had to raise its fare to 10 cents to continue operation. The Regina (Sask.) Municipal Railway has been authorized by the Regina City Council to raise its cash fare to 10 cents and to sell two tickets for 15 cents, four for 25 cents and seventeen for $1.

Six-Cent Fare Extended.—The Wisconsin Railroad Commission on July 31 issued an order extending the present fare charged by the Wisconsin Gas & Electric Company, Kenosha, until further notice. The present fare is 6 cents cash or nine tickets for 50 cents. The extension was granted after the company had showed operating deficits for April, May and June.

Asks Rise in Lake Charles.—The Lake Charles Railway, Light & Water Works Company, Lake Charles, La., has petitioned the Lake Charles City Commission for authority to increase its rates from 6 cents to 8 cents. Action by the commission has been deferred pending investigation of the company's earnings and valuation upon which such earnings are based.

Ten Cents in Findlay.—The City Council of Findlay, Ohio, on Aug. 10 authorized the Toledo, Bowling Green & Southern Traction Company, Findlay, to raise the fare on its local lines from 5 cents to 10 cents. The company had applied to the council for permission to abandon operation. This request was refused. The new rate will continue in effect for a period of two years.

Mayor's Absence Halts Fare Action.—The departure of Mayor Smith of Louisville, Ky., on a vacation trip to Colorado Springs has brought negotiations looking to a solution of Louisville's electric railway problem to a standstill. Members of the City Council say that the Council will take no action of its own accord and that the next step must come from the Louisville railway.

Bringing Home the Cost.—A new plan of publicity intended to show people how much it costs to operate and make repairs to physical property of an electric railway was recently tried out by the Toledo Railways & Light Company, Toledo, Ohio. A new section of curve construction at the corner of Summit Street and Jefferson Avenue, in the heart of the downtown district, bears a huge sign with the legend, "This cost the company $35,000."

Regulate Davenport Buses.—The Board of Aldermen of Davenport, Iowa, has adopted a new jitney bus ordinance

fixing license fees at from $10 to $30 each vehicle and fares at 5 cents during the rush hours and 7 cents during other hours. The ordinance was drafted by the socialist administration as a weapon to fight higher street car fares, but the measure was unanimously adopted by the Council. A bond of $1,000 must be filed for each car.

May Regulate Texas Utilities.—Governor Hobby of Texas recently appointed a committee to draft a public utilities bill for presentation to the State Legislature which meets in January, 1921. The proposed measure would create a State Public Utilities Commission with power to regulate the affairs of electric railways, gas companies and other public utilities. The committee consists of representatives of the Legislature, the utility companies and the state bar.

Quick Service to Beach.—As the result of persistant efforts which began early in 1912, the people of metropolitan Boston, comprising twenty-six cities and towns, have succeeded in procuring a rapid transit service to Revere Beach, the "Playground of New England." It is now possible to reach this famous seashore resort in nineteen minutes from Scollay Square, Boston, via the East Boston tunnel. Over this line the Boston Elevated Railway will operate cars direct to a loop on Ocean Avenue, Revere.

Wants More on Charleston Line.—Application was filed on July 30 with the Public Service Commission of West Virginia by the Charleston-Dunbar Traction Company, Charleston, asking increased rates on its city and interurban lines. The company would install a city rate of 6 cents and a zone rate on its interurban line of 7 cents. Its application states that it is unable to make operating expenses at present rates and that it has no funds for necessary improvements. The interurban line is divided into two zones.

Live-Stock Haulage Sanctioned.—With small-town and rural representatives voting against the larger cities, the Indiana House of Representatives has passed the Douglas bill authorizing interurban companies to haul live stock through the streets of incorporated cities. The bill is of particular interest to Indianapolis, where large shipments of hogs and cattle to the stock yards probably will result, the stock trains passing over the regular passenger lines and adding to the congestion, which already has proved a serious problem.

More Brooklyn Lines To Open.—Service will begin on Aug. 23 on two new extensions of the lines of the Interborough Rapid Transit Company, New York, N. Y., in the borough of Brooklyn. The new tubes are the Eastern Parkway Line extending from Atlantic Avenue to Flatbush Avenue and Prospect Park Plaza and then easterly through Eastern Parkway to Utica Avenue; and the Nostrand Avenue extension beginning at Nostrand Avenue and running to Flatbush Avenue. During the rush hours trains will run every two and one-half minutes.

Want More in Everett.—George Newell, superintendent of the Pacific Northwest Traction & Power Company, Everett, Wash., appearing recently before the Everett City Commission in connection with a street paving project, stated that it soon would be necessary to ask for an increase of the 5-cent fare now charged on the city lines. He declared Everett was the only city in the State that had not raised its fare. Just what would be asked was not stated, but it was intimated that a rate similar to the 10-cent fare charged in Seattle is desired.

Interurbans Ask More.—The Louisville & Southern Indiana Traction Company, the Louisville & Northern Railway & Lighting Company, New Albany, Ind., the Indianapolis & Louisville Traction Company, Scottsburg, Ind., and the Interstate Public Service Company, Indianapolis, Ind. have presented petitions to the Indiana Public Service Commission asking for authority to increase passenger rates to a maximum rate of 3.6 cents a mile. The companies ask an increase of 20 per cent in baggage and milk charges. The basic rates now in force are 2½ cents a mile.

Ten Cents in Muskegon.—Muskegon, Mich., is now paying a 10-cent cash fare. The Michigan Public Utilities Commission recently issued an order authorizing the Muskegon Traction & Lighting Company to increase its fare from 7 cents to 10 cents for a period of sixty days beginning Aug. 1. Four tickets are being sold for 30 cents and children under five years of age are carried for 5 cents each. The commission held that it had no power to order jitney buses off the streets on which the company operates. Substantial increases in wages of employees were agreed upon by the company before the commission consented to the increased fares.

Will Abandon Freight Service.—Freight haulage in less than car load lots between Birmingham and Bessemer, Ala., and Birmingham and Ensley will be discontinued by the Birmingham Railway, Light & Power Company. Permission for the discontinuance of this service was granted by the Alabama Public Service Commission on Aug. 11. At a hearing early in the spring the commission denied the company the right to discontinue the service. The company showed that motor truck competition had so seriously curtailed its service that it was no longer profitable and was resulting in a heavy deficit.

Rerouting Plan Attacked.—Declaring that their business is being ruined as a result of the rerouting of the lines of the Los Angeles (Cal.) Railway, a petition signed by approximately 1,000 business men and property owners was recently presented to the Board of Public Utilities of Los Angeles. In the petition the business men declare that property values along Broadway, Hill, Spring and intermediate streets north of Sixth Street have depreciated in value about $40,000,000 during the past five years, and that the taking away of the customers who use the Western Avenue line is just one more move that will cause a further depreciation in property values.

Wants More on Auburn Lines.—To meet additional expenditures resulting from a recent increase in wages to its carmen, the Auburn & Syracuse Electric Railroad, Auburn, N. Y., has applied to the Auburn City Council to waive its franchise provisions limiting the rate of fare, so as to permit the company to petition the Public Service Commission for an increase in fare from 7 cents to 10 cents. The increased wages recently granted the employees of the system by a board of arbitration will add to the operating expenses of the railway the sum of $90,000 annually. The company's income for the six-month period ending June 30, 1920, was less than the fixed charges and operating costs.

Eight Cents in San Antonio.—W. B. Tuttle, vice-president of the San Antonio (Tex.) Public Service Company, recently notified Mayor Bell of San Antonio that the company would raise its cash fare from 7 cents to 8 cents on Aug. 16. The company proposed to sell four tickets for 30 cents. In his letter to the Mayor, Mr. Tuttle stated that during the months of May, June and July the railway department operated at an actual loss. The deficit for May amounted to $827, for June to $3,085, and for July to $247. On Aug. 1 the company installed one-man cars on its Tobin Hill—Prospect Hill line, which showed a deficit of $1,500 for July. The company has thirty cars suitable for one-man use, twenty-eight of which are in regular service.

Five Cents a Mile Authorized.—The Charleston-Isle of Palms Traction Company, Charleston, S. C., has been authorized by the South Carolina Railroad Commission to charge a fare of 5 cents a mile on its lines. Under the new system many of the stations heretofore maintained are abolished, the company making stops each quarter mile. The company some time ago took action to raise its fare above the previous 3-cent limit, but was restrained by court order from doing so on the ground that a fare in excess of 3 cents a mile was prohibited under the State law. The company recently applied to the Federal District Court for permission to discontinue all service. It later asked the court to permit it to operate during a trial period of one year before rendering a decision.

May Ask Tulsa Rise.—To meet a demand of its employees for an increase in wages of 5 cents an hour, officials of the Tulsa (Okla.) Street Railway have announced that they may be forced to

ask the Tulsa city authorities for an increase in fare from 5 cents to 7 cents. The company entered into an agreement with its carmen in April, 1919, that it would increase their wages commensurately with the increase in the cost of living. Shortly thereafter wages were raised from 45 cents to 50 cents an hour. The men recently informed the management that the prices of necessities had advanced in a greater proportion than wages. The men produced figures showing an increase in the cost of staple groceries ranging from 20 per cent in the case of coffee, to 200 per cent in the case of sugar. Clothing for men and women has increased from 25 to 75 per cent.

Probing California Stage Lines.—A lengthy controversy of rights of the United Stages, Inc., to operate its auto stage service on lines extending over wide territory in Southern California is under investigation of the State Railroad Commission. A hearing was held by the commission on Aug. 9 following the receipt of many formal and informal objections to the operation, rules and certain practices of the auto stage lines and regulation for transfer of certain franchises. It is the contention of interests representing both competing auto stage and rail lines that the United Stages, Inc., and the Morgan Motor Company, which it later absorbed, were not operating as common carriers over certain portions of their present routes on or prior to May 1, 1917, when the present law governing operation of auto stages became effective and that it should accordingly be required to show the public necessity for its service.

Strike Threat Forces Fare Plea.—The receivers of the Manhattan & Queens Traction Corporation, New York, N. Y., have filed a petition with the Public Service Commission asking for permission to increase to 13 cents the fare from Manhattan via the Queensboro Bridge to Jamaica. The receivers notified the commission that the employees of the road had threatened to strike unless they received a 25 per cent increase in wages. The men have since walked out to enforce these demands. The original application for a hearing on the increased fare petition was filed by Walter B. Robinson, attorney for the receivers of the corporation, in September of last year. The Public Service Commission set the hearing for Sept. 9, when the city obtained an injunction preventing the commission from holding it. Justice Finch of the Supreme Court last October in a decision upheld the injunction, whereupon the company appealed. The Appellate Division of the Supreme Court affirmed Judge Finch's decision and the case was taken to the Court of Appeals. The latter court reversed the previous findings and the injunction was dissolved July 7 of this year. The men demand a wage increase of 11 cents to 13 cents an hour. The company has announced its willingness to grant an increase of 5 cents an hour.

Personal Mention

Toronto Transportation Commission Named

P. W. Ellis, George Wright and Fred R. Miller have been appointed by the City Council of Toronto, Ont., as a Transportation Commission to manage and operate the railway system of Toronto on the expiration of the franchise of the Toronto Railway in September, 1921.

In presenting the report of the Board of Control, Mayor Church made a strong plea for generous consideration of the recommendation. He said the Traffic Commission was to be a permanent body, and would start work at once. It was the most important appointment that had been before the members of Council in a long time. Toronto had embarked upon a public ownership policy, and it was therefore necessary that the men chosen to manage the railway system should be avowed public ownership advocates. Many names had been before the Board of Control, but he felt that he was voicing the sentiment of his colleagues on the board in stating that no three men could have been named who would have commanded more widespread support from the public and the press.

P. P. Crafts, until recently manager of the freight department of the Eastern Massachusetts Street Railway, has been appointed purchasing agent, succeeding W. C. Boldt.

W. C. Boldt, formerly purchasing agent and investigating engineer of the Eastern Massachusetts Street Railway, has been appointed superintendent of rolling-stock and shops, succeeding F. D. Ward.

George F. Williams, general superintendent of the Central Maine Power Company, Augusta, Maine, has been appointed general manager of the Androscoggin Electric Company, Lewiston, Maine, to succeed Frederick E. Gordon, resigned.

F. D. Ward, superintendent of rolling-stock and shops of Eastern Massachusetts Street Railway, Boston, has resigned to enter commercial work in China. Forty of his friends in the company gave him a send-off dinner at the Boston City Club on Aug. 11.

H. H. Norris, managing editor of ELECTRIC RAILWAY JOURNAL, has during the present summer made an extended tour through the Northwestern States and western Canada. He made a special study of electric operation on the Chicago, Milwaukee & St. Paul system, and investigated street and interurban railway conditions in Butte, Spokane, Seattle, Tacoma, Portland, Vancouver, Calgary, Winnipeg, Port Arthur and Fort William. He reports a spirit of optimism regarding the prospects of the future of the industry and much activity in bringing rolling stock, track and buildings back to the pre-war standard.

Frederick E. Gordon, general manager of the Androscoggin Electric Company, Lewiston, Maine, has resigned his connection with that company to accept a position with the Cumberland County Power & Light Company, Portland, Maine. Mr. Gordon will be succeeded as manager of the Lewiston property, which comprises thirty miles of electric railway line in addition to a lighting and power system, by George F. Williams, who has been serving as general superintendent of the Central Maine Power Company, Augusta. Mr. Gordon has been connected with the Androscoggin system for a number of years and is regarded as one of the most efficient railway operators of New England.

Obituary

Russell A. Griffin, general sales manager of the National Pole Company, died of pneumonia July 14 at his home. He was for many years connected with the American Telephone & Telegraph Company, and later with the Western Electric Company before going into the pole business.

H. L. Gordon, superintendent of the northern district of the Philadelphia (Pa.) Rapid Transit Company, died on July 14. Mr. Gordon had been in the service of the company since 1893. In 1898 he was made a division superintendent. He assumed his duties as superintendent of the northern district on July 1, 1919.

Roscoe D. Smith, formerly general manager of the Illinois Traction System, Peoria, Ill., died recently. Mr. Smith was in charge of the affairs of the company during the construction period from 1905 to 1910. He later went into business as a railroad construction engineer with offices in St. Louis, Mo. He was fifty-four years old.

Jeremiah E. Reeves, seventy-five years of age, who owned a controlling interest in the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, died suddenly of apoplexy at his home in Dover, Ohio, on July 11. Mr. Reeves founded a sheet and tin mill at Dover which has developed into one of the largest in the country. He left a considerable estate in Toledo.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Commutator Segments in Normal Demand

Raw Material in Good Supply, but Transportation Is Delaying Deliveries

Manufacturers of commutator segments for railway motors report that sales are proceeding at about a normal pace but that demand is not extraordinarily heavy. These segments have probably been in a little heavier demand than usual as the result of necessary repairs to the many motors which were damaged by the severe storms last winter.

With the supply of copper in as easy a position as at present, raw material is not a question to worry producers especially, but considerable complaint is heard against transportation as a factor in lengthening deliveries, which are quoted by several representative manufacturers at from six to twelve weeks. These same companies report a normal volume of production that is gradually catching up with those orders which in some cases have fallen behind as a result of long deliveries. No orders have been canceled, however.

Labor troubles are here and there experienced, but as a whole the situation in that respect is considered good. Prices at present are steady, and while some companies look for further increases, those that think the market will remain firm seem to be in the majority.

Collections are rather slow and accomplished with difficulty according to the credit manager of one of the largest manufacturers of this material. Public utilities appear to be the worst delinquents in this respect, but with financial relief being more and more accorded in the form of rate increases improvement is looked for.

Railways Buying More Waste at Present

Closing of Textile Mills Is Seriously Cutting the Supply and Stocks Are Running Low

Waste manufacturers who sell direct to large consumers, such as railways, are meeting a very good demand for their product at present, although some producers who deal with jobbers say they are not finding a strong market in that quarter, due probably to uncertainties in the cotton and woolen market that may be causing distributers to hold off from purchasing.

As a matter of fact it is said that both steam and electric railways are using more waste now than for some time past, about 60 per cent of the output of one of the large producers going to this market alone. It is also stated that the increase in freight rates has already considerably swelled the volume of orders, as steam railroads are anticipating their requirements by ordering ahead to insure an adequate supply of material for the additions they will make to their rolling stock. It seems reasonable to suppose therefore that purchasing agents of electric railways must reckon on this increased market competition in providing a sufficient supply for their own needs.

Even if demand increased to a much greater extent, however, this would not be a circumstance to cause any alarm under normal conditions. But just now the situation is far from normal with a severe shortage threatening if no relief appears in sight, and the question of relief will largely depend upon the action of the textile mills, upon whose output the manufacturers of waste are dependent for their production. In spite of the fact that raw cotton has been dropping in price under the pressure of plentiful supplies and lessened demand, the situation with regard to cotton waste has been growing worse. This is because the production of waste bears no direct relation to the supply of cotton fiber, but is dependent instead upon the textile mills, which, as a by-product, turn out the material from which waste is made. There is an even greater dearth of woolen waste, as not only are many of the cloth manufacturers in that line closed down too, but the wool industry is in a condition approaching demoralization in the wool growing states of the Intermountain section.

Transportation delays have been adding their quota to the foreboding outlook, although some slight relief in that respect is reported now. Deliveries are an uncertain quantity, however, as no promises are made, but textile mills simply turn over raw material to the waste manufacturers as it becomes available and the latter in turn pass the goods on to their customers. In general, there are no stocks of the finished material, although in isolated cases producers report a fairly good stock through having supplies of material that were previously held at the mills unloaded on them. Prices have not increased materially, cotton waste being quoted at about 13 to 18 cents a pound and wool waste 13 to 22 cents a pound, according to grade. In some quarters, however, it is stated that an increase of about a cent per pound is expected.

Iron Wheel Market Shows Slight Improvement

Factory Stocks Low, but Deliveries Are Better—Transportation Is Chief Factor in Impeding Production

Electric railway buying of chilled-iron wheels exhibits a present tendency on the part of purchasing agents to place orders farther ahead than hitherto, although the amount of new business being handled runs along on an even keel. The greater part of the present business is renewal in character, and on representative orders a differential of about 3.75 cents per pound was recently quoted on 500-pound wheels. Factory stocks are pretty well cleaned out, except in cases where the contract between the railway company and the manufacturer provides for the continuous maintenance of a stated number of wheels in reserve stock subject to prompt shipment. Deliveries, however, are being quoted on a three to four weeks' basis, which is a great improvement over recent conditions.

In one particular case a large road recently ordered 5,000 wheels for replacement service, compared with a usual contract for 3,000. It is believed in some purchasing circles that no immediate changes in price are to be expected in wheels. One large manufacturer states that at present prices are about 50 per cent above the pre-war level. This concern put a 25 per cent increase into effect last winter, thereby advancing wheel quotations from an approximate 25 per cent sur-charge above the pre-war level. Following the signing of the armistice, wheel prices dropped off materially, but recent difficulties in securing raw material forced an advance. Labor is now in easier supply and doing somewhat better work than earlier in the year, so that if the transportation situation should be materially improved, raw material would flow into the factories in better volume and with greater punctuality, thus opening the way to increased production. The chances of early improvement in freight conditions, however, are not very bright. Fortunately, wheel factories are well distributed over the country, and the effect of local embargoes is thus minimized. A few days ago one factory had its outgoing shipments curtailed 50 per cent by the rail-

road system serving it, but it is not believed that this condition will last long. Gradually the resumption of rolling stock orders by the steam railroads is having its effect, and is expected to relieve the present uncertainties. Little night work is being done in the wheel factories, so far as can be learned. The price per pound of material represented by chilled-iron wheel quotations today compares very favorably with prices of other materials entering into car construction, and the present seems a particularly favorable time in which to order supplies of this kind.

No Favoritism in Allocating Supplies

Freight Embargoes Account for Some Sections Receiving More Material than Others

There is a feeling among some Pacific Coast buyers that manufacturers have been neglecting them in favor of Eastern firms, but an investigation shows that buyers in the East think it is they who are being discriminated against. During the switchmen's strike the East had some cause for complaint because the Far West received more than its share of electrical apparatus from Middle Western manufacturers for the reason that railroads would not accept shipments consigned to the East. Local buyers in cities where the factories are established also complain that others are getting more goods than they. However, no one in the field seems to have been able to obtain all the supplies that were needed, and this appears to have been at the root of the trouble rather than any discrimination in favor of or against any geographical group of buyers. Furthermore, there is every indication that deliveries in most lines are improving and that they will continue to grow better for some time to come.

Almost all the principal manufacturers of electrical apparatus allot a certain percentage of their output to each section of the country, and this allotment is based on the records of previous requirements. Every effort seems to have been made to treat all customers alike, and there has apparently been no idea of diverting shipments from representatives or customers on the Pacific Coast. During railroad embargoes, however, it is a case of making shipments according to the dictates of the transportation companies.

Electrification of German Railways Near Cities

According to the Bureau of Foreign and Domestic Commerce, coal as a power producer will be replaced so far as possible by the use of peat and the electrification of railroads in the vicinity of the large German cities. Great hopes are being placed on the new Theissen 10,000-hp. vertical gas turbine, two of which have been ordered for use on the German railways.

In regard to the electrification of the German railways near large cities, it is planned to install large central power houses, which will be equipped with peat-burning furnaces. The peat bogs in the vicinity of Osnabruck will furnish this fuel. Machinery for the working of this peat has been installed, and it is hoped that the first deliveries will take place by Sept. 1, 1920.

Orders for Fiber Conduit Booked Ahead

Output Inadequate to Meet Demand—Labor and Material Costs Increasing Prices

Buying of fiber conduit in the larger sizes has been very noticeable of late. Much of the material now going through and on order is of the 4-in. size, and some is going to 4½ in. In line with this there has been good buying of the larger sizes of lead-covered cable. At the same time it is known that as much duct ventilation as possible is desired.

Manufacturing output as a whole is booked up well into the last quarter of this year, October being well covered and much running into November. Here and there, however, a few small amounts may be taken care of late in September. At the same time, a good bit of business has been placed for 1921 delivery, and from the nature of the cable buying which has been going on this summer, it is rather expected that within the next few months fiber-conduit production will be well cared for for delivery running several months into the next year.

Demand is good all over the East and the Middle West, but there is not enough capacity to supply it quickly. The raw-material situation is in fair shape, but prices on pulp and compounds have advanced, along with the rates paid to mill workers all along the line to the finished conduit. Consequently, advances in price were made on the finished pipe during June and July, amounting to about 15 per cent. Labor is still unsteady and hard to obtain, and turnover is all too frequent. Because of this, considerably more attention is being paid to the inspection of the product in its various stages of manufacture, with a consequent higher cost of production. Extra night shifts are particularly difficult to get and to keep.

Export demand is good, but shipping rates are almost prohibitive. There is not enough fiber conduit made to supply both foreign and domestic trades, so the foreign allotments are liable to suffer.

Western Red Cedar Association Holds Annual Meeting

At the fifteenth annual meeting of the Western Red Cedar Association, held at Spokane, Wash., on July 30, nine companies were represented, including E. T. Chapin Company, Metropolitan Cedar Company, National Pole Company, Northern Cedar Company, Sandpoint Lumber & Pole Company, Searl-Waterman Company, Valentine Clark Company and Western Lumber & Pole Company.

Reports of various committees were heard, and the advertising program of the association was discussed. The officers elected were: Morton Macartney, president, and E. A. Lindsley, vice-president, while L. L. Hill, H. J. Searl and E. L. Clark were renominated as directors to serve for one year with the president and vice-president.

Rolling Stock

Recent announcement that the Pacific Electric Railway was to spend $1,400,000 for new equipment has been followed by orders placed during July for equipment which included forty-nine Birney type safety cars ordered from the American Car Company of St. Louis, Mo., and twenty all-steel multiple-unit cars for interurban service, equipped with motors for 600-1,200 volts automatic changeover. These new cars will be similar in design to twenty-four cars of the same type now in interurban service on the Pacific Electric Lines. The length of these is 58 ft. 1 in., the width 9 ft. 2 in., and the average weight of each car is 107,000 lb. without passenger load. Some of these new cars will contain compartments for smoking. This type of equipment is entirely a closed car and has no open section like some of the company's other interurban equipment. The order has been placed with the Pullman Company. This order also included ten all-steel cars of the same type as above but without motors, as they will be used as trailers in the operation of two, three or four-car interurban trains. The order for non-motor cars was also placed with the Pullman Company. Cars of this class contain thirty-two seats, thus accommodating sixty-four passengers.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has begun relaying the tracks of its East Seventh Street line, Long Beach.

Humboldt Transit Company, Eureka, Cal.—The Humboldt Transit Company is rebuilding 2,300 ft. of track on the route of a new highway. The construction is concrete with Warrenite top.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has been granted an extension of forty-five days in which to complete its track laying on East Colorado Street between the Santa Fé track and Los Robles Avenue. Under the provisions of the ordinance the company has 180 days from April 1 last in which to lay its new tracks on East Colorado Street from Los Robles Avenue to a point 200 ft. east of Mentor Avenue. The company is considering a plan for a sub-

way from the Hill Street station to Figueroa Street and then to Vineyard Junction.

Interstate Public Service Company, Indianapolis, Ind.—High-tension electric current from Jeffersonville to Indianapolis was turned on a few days ago by the Interstate Public Service Company, which operates the lines of the Louisville & Northern Railway & Lighting Company as far north as Sellersburg, Ind., and the lines of the Indianapolis & Louisville Traction Company from that point to Indianapolis. All the current will be supplied from Louisville and Indianapolis. There will be a standard voltage, 600, from Jeffersonville to Indianapolis, instead of 1,200 volts from Sellersburg, north.

Middlesex & Boston Street Railway, Newtonville, Mass.—The Middlesex & Boston Street Railway has refused to change the grade of tracks on Crescent Street, and as a result the city is forced to suspend the rebuilding of Crescent Street.

Springfield (Mass.) Street Railway.—The Board of Aldermen of Springfield has received five petitions from the Springfield Street Railway asking the right to locate and relocate tracks for proposed improvements in the East Springfield district.

New York & Queens County Railway New York, N. Y.—The Public Service Commission of the First District has notified W. O. Wood, president of the New York & Queens County Railway, that it must rebuild its tracks in Main Street, Flushing.

Public Service Railway, Newark, N. J.—The State Board of Public Utility Commissioners has issued an order granting permission to the Public Service Railway to change the Sixth and Eighth Street line in Camden and the Borough of Woodlynne. The company will divert the route from Ferry Avenue to follow the line to Haddon Heights, N. J., and will install a crossover to provide for turning cars on the outskirts of the town.

Muskogee (Okla.) Electric Traction Company.—Officials of the Muskogee Electric Traction Company announce that, when the viaduct over the Missouri, Kansas & Texas tracks has been repaired, double car tracks will be laid across the viaduct.

Dallas (Texas) Railway.—The Dallas Railway will be asked to extend the tracks of the State Street line from State Street to Haskell Avenue and along Haskell to Cole Avenue. This improvement will be necessary because of the erecting of the new North Dallas High School Building.

Houston, Bayshore & Texas City Traction Company, Houston, Texas.—The Houston, Bayshore & Texas City Traction Company has petitioned the City Council for the right of way over certain streets within the city limits. The proposed line is to begin on Polk Avenue and cross Telephone Road.

Franchises

Los Angeles (Cal.) Railway.—The Los Angeles Railway has applied to the City Council for a franchise to construct, operate and maintain a double-track electric railway in South Park Avenue, Los Angeles.

Webster, Monessen, Belle Vernon & Fayette City Street Railway, Charleroi, Pa.—This company has been granted a franchise to construct an electric line in Schoonmaker Avenue, Tenth Street and other thoroughfares in the borough of Monessen.

Power Houses, Shops and Buildings

Humboldt Transit Company, Eureka, Cal.—The Humboldt Transit Company has installed a 300-kw. rotary converter.

Los Angeles (Cal.) Railway.—A building permit authorizing the construction of a $550,000 terminal for the Los Angeles Railway at the northeast corner of Eleventh Street and Broadway, Los Angeles, has been issued from the office of the city building inspector. The structure will be 130 ft. in height, containing ten floors, and will be constructed of reinforced concrete. The executive offices of the company will occupy the four top floors, the remaining part of the building to be leased out for office purposes.

Trade Notes

The Sanford Riley Stoker Company announces the removal of its Worcester (Mass.) office from 25 Foster Street to 9 Neponset Street.

The Ohio Electric Controller Company, 6900 Maurice Avenue, has awarded contract for erection of an addition to its factory, to cost about $60,000.

The Electric Controller & Manufacturing Company, 2700 East Seventy-ninth Street, Cleveland, Ohio, has opened a new office in the Witherspoon Building, Philadelphia, in charge of H. K. Hardcastle.

The Locke Insulator Manufacturing Company, Victor, N. Y., announces the resignation of B. A. Plimpton, sales manager, effective Aug. 15. For the present his duties will be taken over by D. H. Osborne, acting sales manager at Victor, N. Y.

Ralph B. Coleman, formerly of the Chicago offices of the Maloney Electric Company, has joined the sales forces of the Consolidated Wire & Machinery Corporation, 519 West Van Buren Street, Chicago. Mr. Coleman has been in the West for the past twenty years and has a wide acquaintance among central-station men in that section.

L. F. Rurey, formerly in charge of the electrical department of the George H. Smith Steel Casting Company, Milwaukee, Wis., has been appointed electrical superintendent for the Milwaukee Rolling Mills Company, which was organized about a year ago. Mr. Rurey has been engaged in electrical maintenance and construction work for the past ten years.

Edward W. Harry, electrical engineer of the National Tube Company, McKeesport, Pa., left the electrical department on July 17 to become chief electrical engineer with the Pittsburgh Steel Company at Monessen, Pa. Mr. Harry started with the electrical department in 1910 as a lineman and while there took a course in electrical engineering in the Carnegie Institute of Technology, from which he was graduated in 1915.

The Porcelain Insulator Corporation, Lima, N. Y., recently incorporated with a capital stock of $250,000, is planning to erect a new plant on the old site of the plant of the Locke Insulator Manufacturing Company, which was destroyed by fire more than a year ago. The new company will manufacture high-voltage porcelain insulators and electrical appliances, starting with a four-kiln capacity. It is expected to have the plant in operation by January, 1921. W. F. Harvey is president, D. H. Finucan vice-president, B. A. Plimpton secretary and V. E. Taylor treasurer.

New Advertising Literature

Valve-Closing Device.—The Cutler-Hammer Manufacturing Company, Milwaukee and New York, has issued an illustrated leaflet entitled "Extension to L Street Station, Boston," in which a brief description is given of the Dean control.

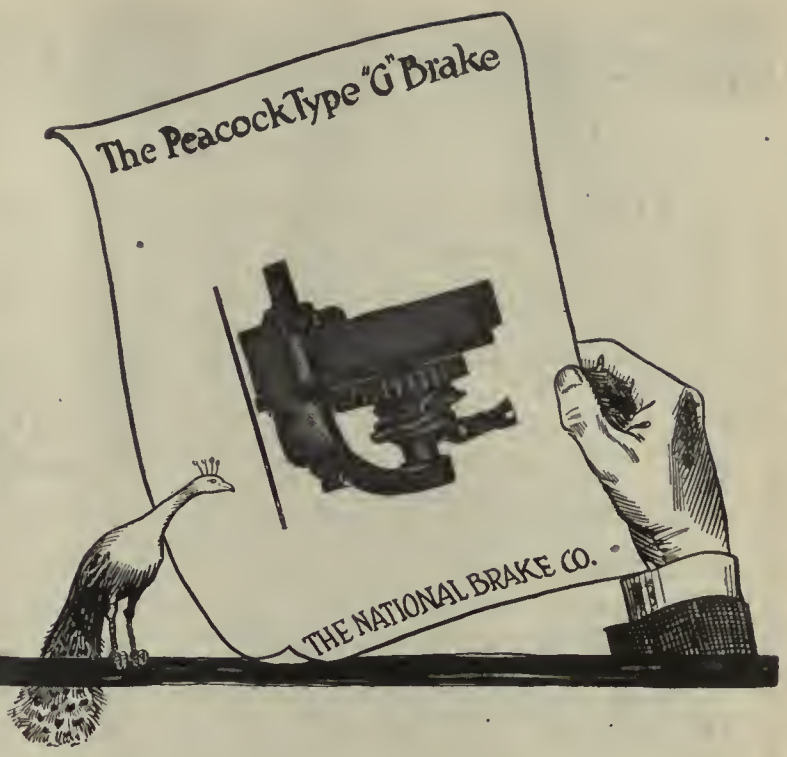
Conduits.—The Garland Manufacturing Company, West Pittsburgh, Pa., is circulating two small leaflets, one entitled "Galvaduct" (galvanized) "Loricated" (enameled), covering its rigid conduits, and the other entitled "Sterling Flexible," describing its flexible armored conductor.

Waterwheels and Governors.—The Holyoke Machine Company, Worcester, Mass., has issued catalog No. 13, covering its different types of Hercules turbine waterwheels, and also a small booklet entitled "The Improved Governor," in which it describes its new governor for waterwheels.

Air Compressors and Pumps.—The Crowell Manufacturing Company, 298 Taaffe Place, Brooklyn, N. Y., is circulating two leaflets covering its type "A" and type "B" positive pressure blowers or rotary air pumps and type "D" rotary air compressors or vacuum pumps.

Voltmeters and Indicating Meters.—The Roller-Smith Company, 233 Broadway, New York City, has recently issued bulletin No. 150, covering its small portable type H A voltmeters, ammeters and indicating wattmeters for alternating current.

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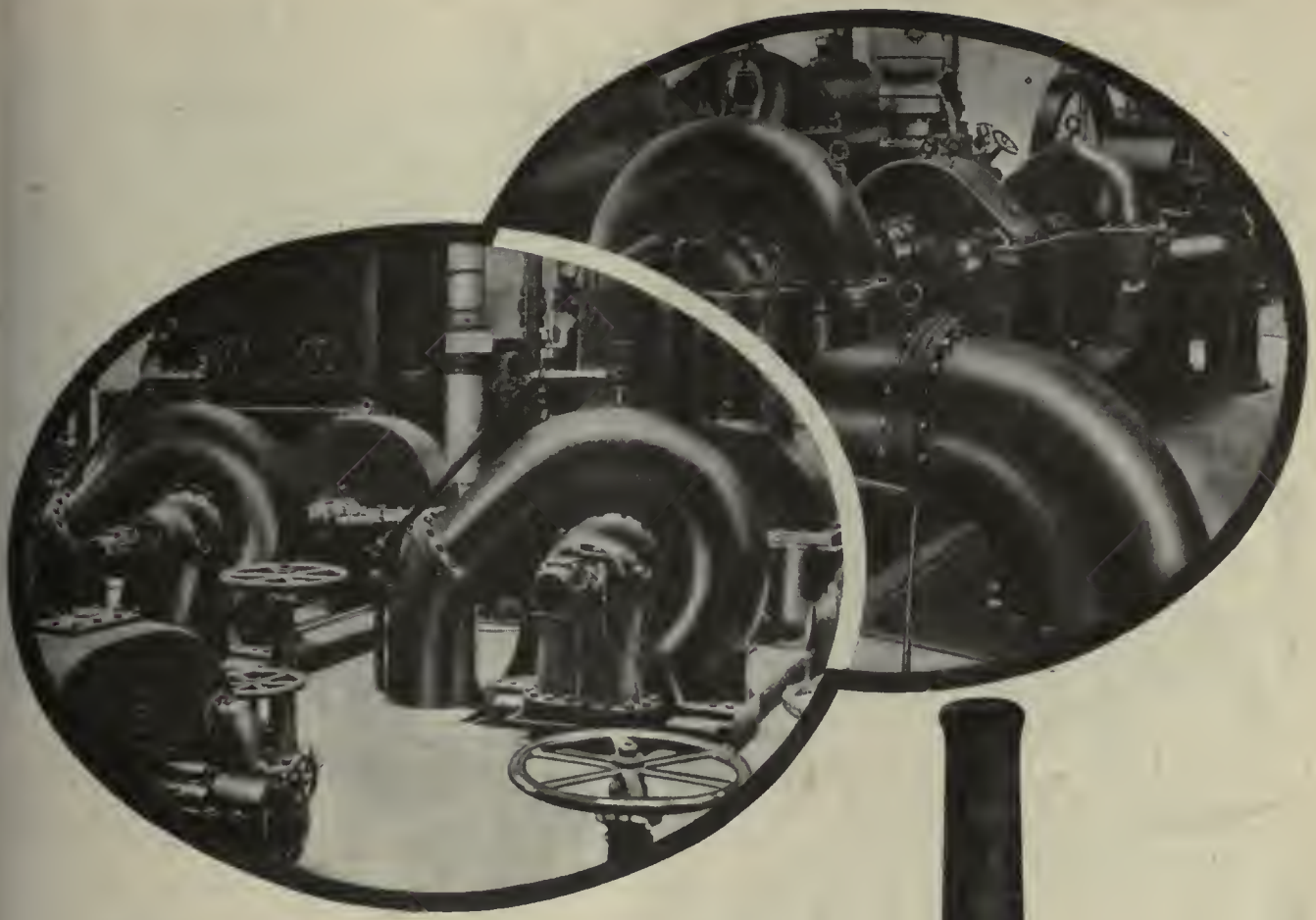
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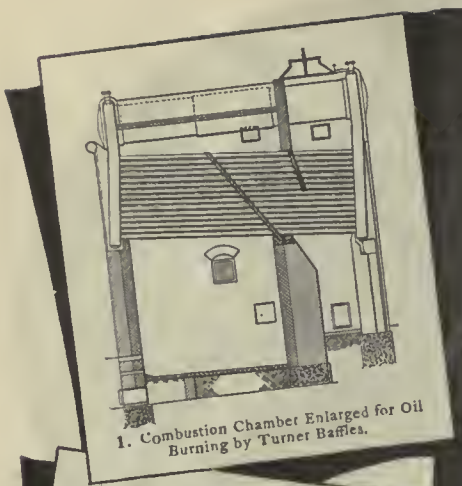
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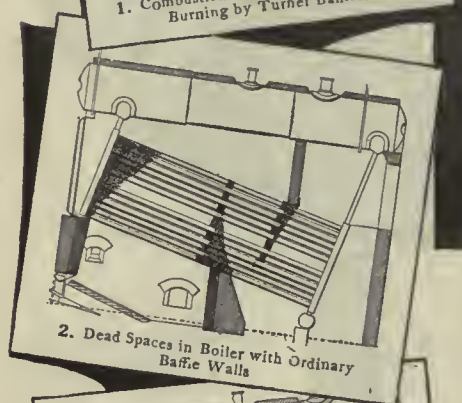
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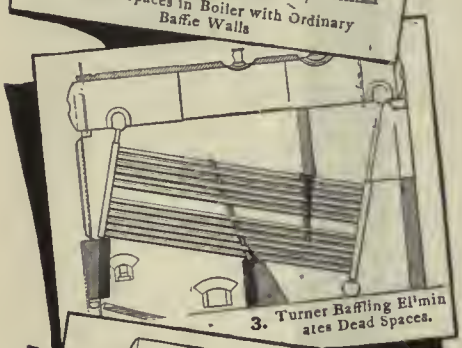
Turner Baffle Walls



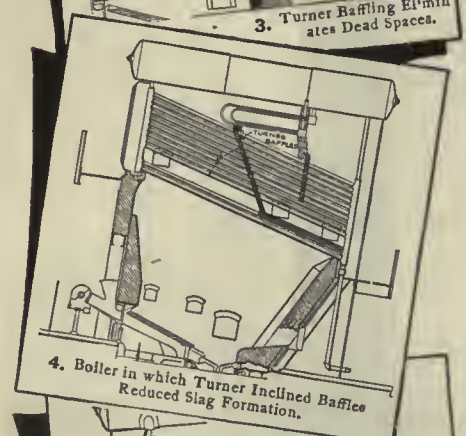
1. Combustion Chamber Enlarged for Oil Burning by Turner Baffles.



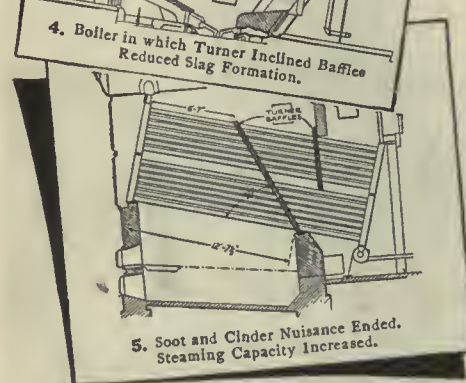
2. Dead Spaces in Boiler with Ordinary Baffle Walls



3. Turner Baffling Eliminates Dead Spaces.



4. Boiler in which Turner Inclined Baffles Reduced Slag Formation.



5. Soot and Cinder Nuisance Ended. Steaming Capacity Increased.



Ending the Troubles of Water Tube Boilers

THE outstanding feature among the advantages of Turner Baffle Walls is that they can be built tight to stay tight *at any angle.* This has made possible the correct engineering solution of many combusion problems which could not be solved by any other means. For example:

ENLARGING COMBUSTION CHAMBER FOR OIL BURNING. This necessary change (figure one) was effected by first lowering the furnace bottom as far as possible, then carrying back the bridge wall and installing Inclined Turner Baffles.

The enlarged furnace chamber permitted complete combustion before the gases reached the tubes thus preventing the destructive action of gases burning in the tube space. 100 tubes had been lost in four months in one boiler; in a year since the change not a tube has been lost.

INCREASING HEATING SURFACES. Turner Baffles permit tapering the pass to whatever degree is correct to meet the design requirements of any boiler setting. Figure two shows the dead spaces not reached by the hot gases in a boiler setting equipped with ordinary baffles. Figure three shows how the correctly tapered pass, made possible by inclined Turner Baffles, subjected practically the entire tube surface to the heat. The correction also relieved a serious restriction through the second pass.

REDUCING SLAG FORMATION. A flying, fusible ash, thrown off by certain grades of soft coal, often sticks to the lower tubes in the first pass. A restrction of the space tends to cause positive pressure in the fire, reducing combustion efficiency snd often causing permanent injury to the stoker.

The Turned Inclined Baffle provided s larger entrance to the first pass, thus reducing the gas velocity. Consequently less fusiblc ash is drswn into the pass, the tubes absorb more heat by radiation, lowering the furnace temperature, less ash adheres to them, and the greater area permits running longer before restriction becomes dangcrous.

ELIMINATING THE SOOT AND CINDER NUISANCE. In this boiler, (figure five) Turner Baffles not only increased steaming capacity to a marked degree, but eliminated previous difficulties from soot and cinders by causing them to roll down the back face of the front baffle into a soot pocket. They can then be easily removed with the boiler steaming at full capacity.

These few instances are characteristic of the many combustion faults corrected by the adaptability of Turner Baffle Walls. Other difficulties and objectionable features which have been overcome are High Stack Temperatures, Incorrect Drafts, Reflected Heat.

In our booklet, "The Development of an Idea," you may find the solution to your own boiler problems. *Write for it today.*

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When is a Stoker Automatic?

Answer this question by weighing the considerations which have brought so much favor to stoker firing. The stoker is installed to minimize labor and fuel expense and to increase capacity—steaming capacity. Technically no stoker can be truly automatic because it is of course, impossible to entirely eliminate the human element; nevertheless the *degree* of automatism is the factor that largely determines a stoker's ability to properly meet these foremost requirements.

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The Ohmer System

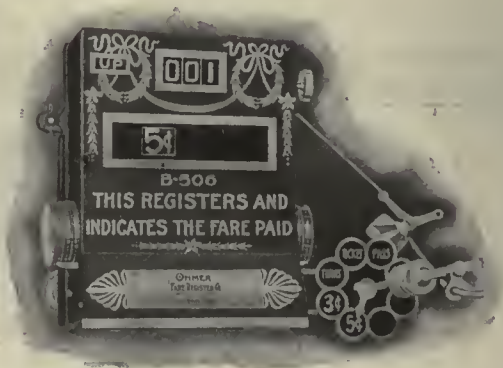
Interurban electric railway companies have made Ohmer fare registers a standard because many different fare denominations are accurately recorded, indicated and thoroughly protected.

City railway managers now realize that they also have a considerable variety of fare rates to be protected, and many Ohmer fare registers of types suitable for city service are being adopted. Cash fares in odd amounts, metal or paper tickets, school tickets, transfers, employes' passes, special passes, etc., are differentiated, indicated and properly recorded when Ohmer fare registers are used.

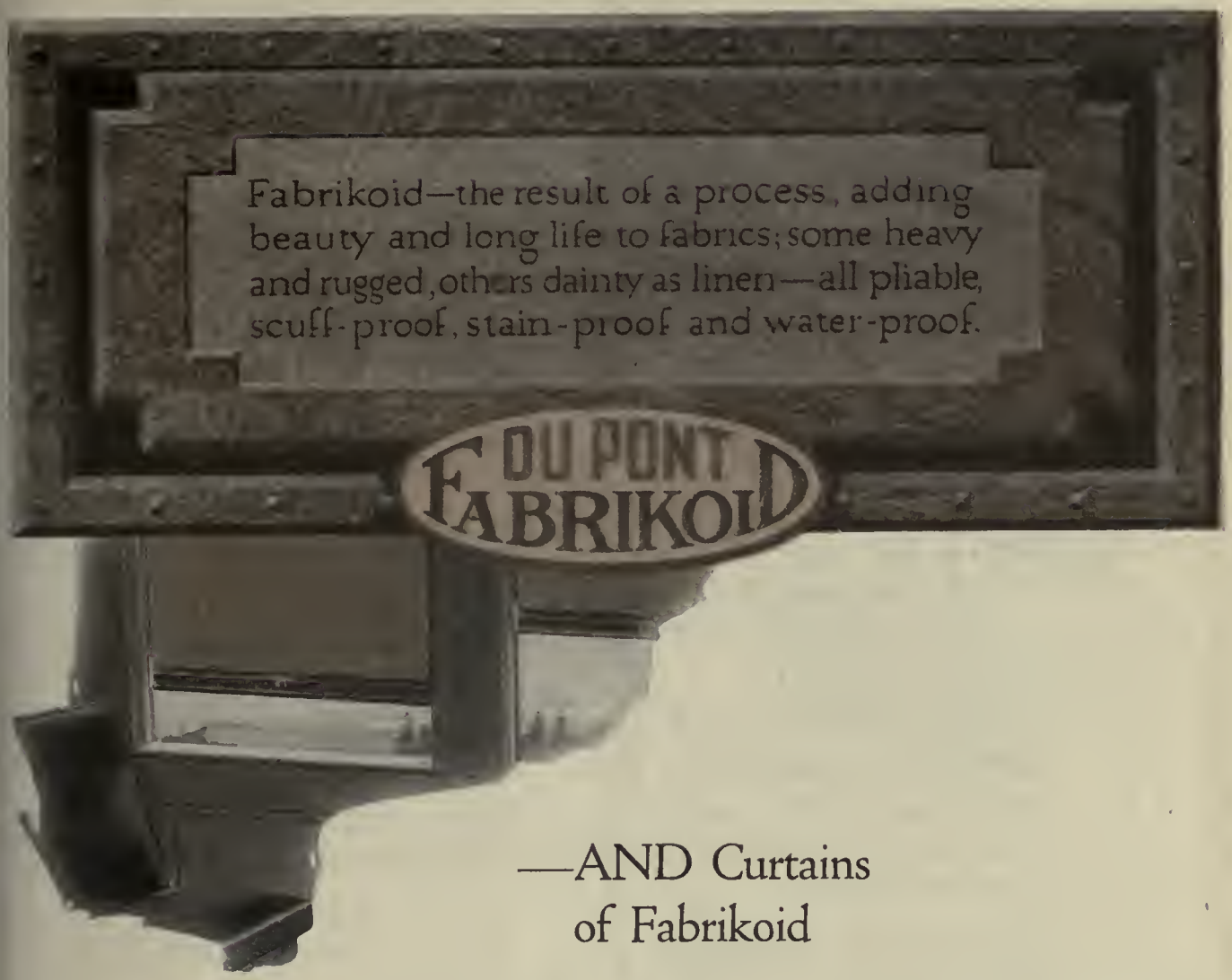
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All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

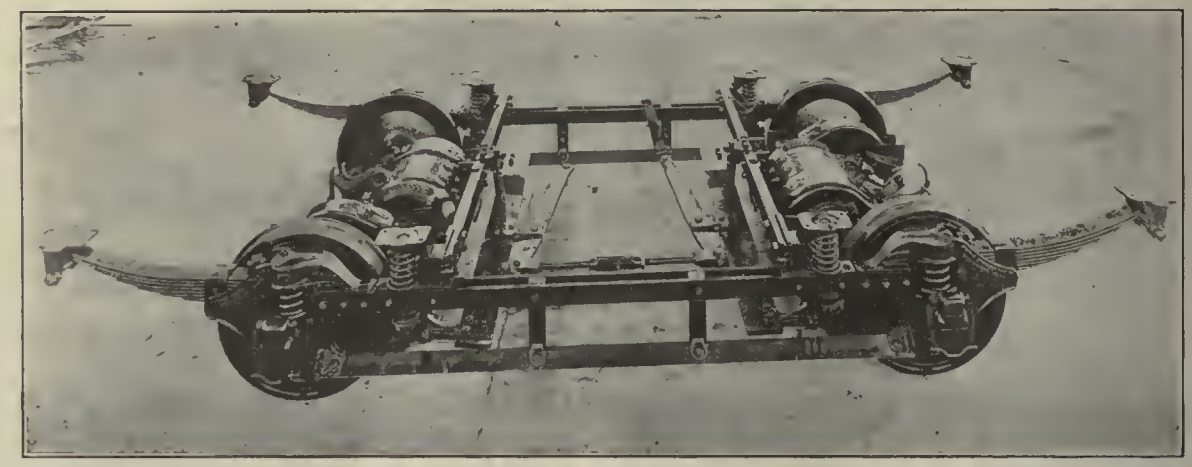
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This frame is tied together and braced transversely by channels at the top secured to the top members of the frame by combination steel gusset castings.

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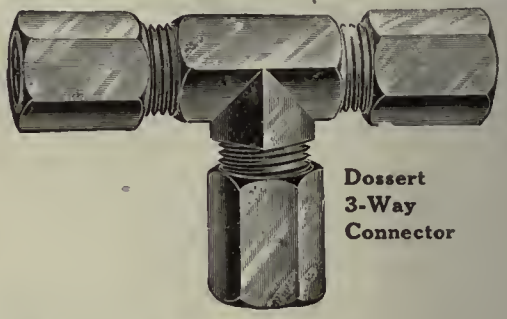
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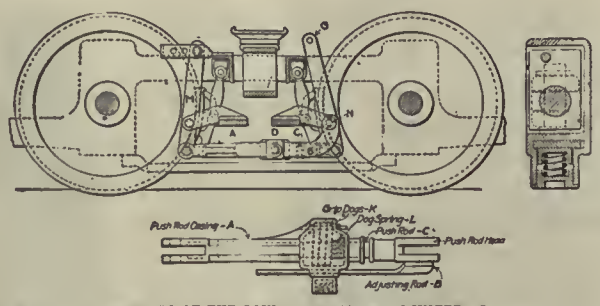
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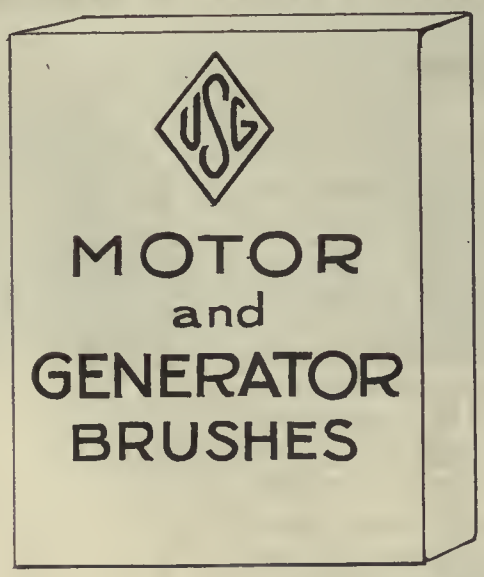
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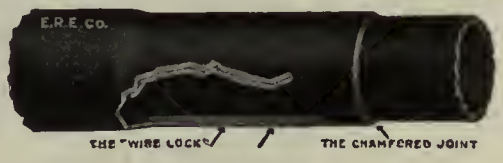
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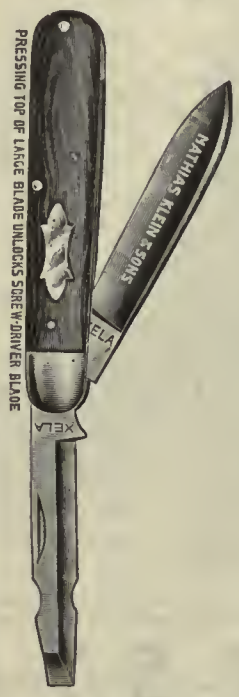
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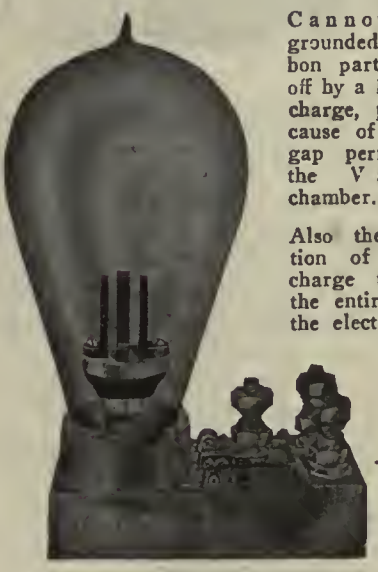
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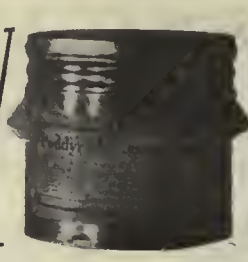
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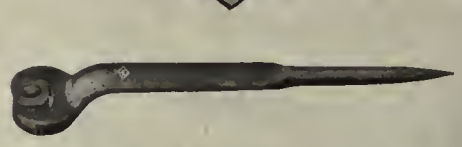
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Type R-10
Single Register

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

The International Register Co.
15 South Throop Street, Chicago



A Long Record of Satisfactory Performances

For nearly 15 years American Railways have standardized on

B-V Punches

Because—

their tool steel dies last the longest.

Their finely tempered springs never break.

Their workmanship has always measured up to an ideal.

Send for Catalog

Bonney-Vehslage Tool Co.
Newark, N. J.

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

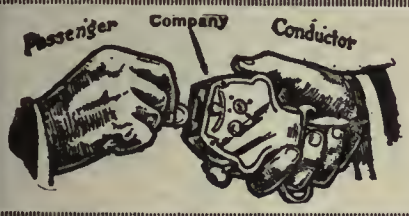
CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO



The absence of intricate mechanism makes the maintenance cost of Cleveland Fare Boxes very low. Only three working parts.

The Cleveland Fare Box Company
Cleveland, Ohio

Canadian Branch, Preston, Ontario



Direct Automatic Registration By the Passenger
Rooke Automatic Register Co.
Providence, R. I.

"It Behooves You to Hooverize Your Motormen"

We can help you
Write to
The Arthur Power-Saving Recorder Co.
2nd National Bank Bldg., Naw Haven, Conn.



Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
30 Church Street, New York City

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
Carlisle, Pa.



Le Carbone
Carbon Brushes are uniform. They talk for themselves.

W. J. Jeandron
227 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



FLOWER
Railway Brush Holders
SIMPLE—PRACTICAL—EFFICIENT

D. B. FLOWER
1217 SPRING GARDEN STREET
PHILADELPHIA

"Zero" for Axle and Journal Bearings

AND

"Motor" for Armature Bearings

STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

Write us for details.

E. L. Post & Co., Inc., Sole Mfrs., 50 Cliff St., New York City

B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; Harold A. Hegeman, Vice-President and Treasurer; Fred C. J. Dell, Secretary; W. C. Lincoln, Manager Sales and Engineering.

National Railway Appliance Co.

50 East 42nd St., NEW YORK CITY

Hegeman-Castle Corporation, McCormick Bldg., Chicago Ill.
National Railway Appliance Co., Munsey Bldg., Washington, D. C.
National Railway Appliance Co., Little Bldg., Boston, Mass.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions, Anderson Slack Adjusters, Genesco Paint Oils, Clapp's Fire Resisting Paint, Dunham Hopper Door Device, Feasible Drop Brake Staffs, Anglo-American Varnishes, Paints, Enamels, Surfaces, Shop Cleaner, Johnson Fare Boxes, Drew Line Material and Railway Specialties, Perry Side Bearings, Miller Trolley Shoes, Hartman Centering Center Plates, Economy Power Saving Meters, H. and W. Electric Heaters, Garland Ventilators, Pitt Sanders, National Safety Car Equipment Co.'s One-Man Safety Cars.



MORE-JONES "TIGER-BRONZE" AXLE AND ARMATURE BEARINGS

Not always the cheapest, but ever lowest in ultimate cost

MORE-JONES BRASS & METAL CO.
St. Louis, Missouri

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

ARMATURE winder wanted on railway motor and compressor armatures; experience on bar wound as well as coil wound armature desirable; good wages; location Middle West. P-709, Elec. Ry. Journ., Old Colony Bldg., Chicago.

COMPETENT engineer wanted with experience in design of overhead line material for direct suspension and catenary line construction. State age, experience, salary and when available. P-718, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

COMPETENT master mechanic wanted for City property in Middle West. P-702, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

COMPETENT master mechanic wanted by street railway in Central West operating 70 cars; considerable portion of equipment light weight safety type; state age, previous experience, and salary desired; all replies will be considered strictly confidential. P-710, Elec. Ry. Journ., Old Colony Bldg., Chicago.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West; state experience, references, and salary desired when replying. P-605, Elec. Ry. Journal, Old Colony Bldg., Chicago.

EXPERIENCED master mechanic for a system operating traction service on both city and suburban lines. Must have extended practical experience in maintenance and repair of rolling stock and equipment. In replying, state experience and other qualifications. P-640, Elec. Ry. Journal.

FIRST class street car mechanic wanted, one experienced with mechanical and electrical equipment of street cars. Address Corpus Christi Railway & Light Company, Corpus Christi, Texas.

MAN wanted experienced in overhauling cars and motors and maintenance of equipment; good position for steady man. P-724, Old Colony Bldg., Chicago

ONE first-class armature room foreman wanted for a shop employing about thirty people. Must be familiar with all types railway armatures. State experience and salary desired. P-706, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

PERMANENT employment for first class draftsman, familiar with electric and steam railway special work, with manufacturing concern near New York City; state full experience and salary desired. P-713, Elec. Ry. Journ.

PERMANENT employment for first-class draftsman, familiar with electric and steam railway special work with manufacturing concern near New York City. State full experience and salary desired. P-719, Elec. Ry. Journal.

WANTED Assistant to Master Mechanic on large Interurban and City Property located in Southwest. Applicant must know the business and be able to do office work, drawing, etc. P-722, Elec. Ry. Journal, Old Colony Bldg., Chicago.

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad and also local address of office to which reply is sent.

10th Ave. at 30th St., New York.
935 Real Estate Trust Bldg., Phila.
533 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents — send copies.

POSITIONS VACANT

TRAINMASTER for interurban, suburban and city lines. Must be capable of handling trainmen and details of operation. State experience, reference and salary expected. P-720, Elec. Ry. Journal, Old Colony Bldg., Chicago.

UTILITY company in West Indies desires services of young aggressive superintendent of street railway system; must have had similar experience elsewhere; be able to handle men and get along with labor; obtain efficient results; train employees and give the public efficient service. System operates 50 cars and 20 miles of track; only man of aggressive and efficient personality need apply. Give full particulars of past expereince, photo and reference. P-707, Elec. Ry. Journal.

POSITIONS WANTED

A CHANGE of position is desired by a young man experienced in street railway shop work; now engaged as assistant to superintendent of equipment. PW-715, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

AUDITOR, specialist for rehabilitating traction properties, solicits connection with large company; reference present employer. PW-629, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CAPABLE technical man of proven executive ability, now employed, seeks opportunity in responsible position with a property where initiative and dependability are valued; 14 years' experience electric railway field; 10 years responsible charge of work; thoroughly competent in the design, maintenance and operation of equipment; successfully handled labor; experienced in making reports on traffic and methods of effecting operating economies. PW-708, Elec. Ry. Jornal, Old Colony Bldg., Chicago.

CLAIM agent 40 years old, active and full of life, long experience, desires to make change; expert shorthand writer, obtaining most thorough information investigating accidents, from both injured and witnesses; motormen and conductors most carefully instructed; fine record on low settlements; take own photos of accidents; thorough and up-to-date office system installed; excellent references. PW-694, Elec. Ry. Journal.

ENGINEER with broad experience desires position in constructing, maintaining, rehabilitating and appraising electric street and interurban railways. PW-711, Elec. Ry. Journ., Old Colony Bldg., Chicago.

POSITIONS WANTED

EXECUTIVE open for engagement, experienced in management and operation of railway and electric properties; thoroughly conversant with accounting, purchasing, finance, public policies, rates design and construction; references furnished if desired. PW-717, Elec. Ry Journ., Old Colony Bldg., Chicago.

FOREMAN — Experienced in overhauling and maintenance of rolling stock, motors, etc.; handle men to advantage; best references. PW-712, Elec. Ry. Journ.

SUPERINTENDENT, 17 years' experience in transportation, traffic and mechanical, on road operating in eastern Ohio. A-1 references, executive ability, competent to assume full charge; can get results. Address PW-639, Elec. Ry. Journal, Cleveland.

MAN, age 35, 16 years' experience in transportation departments as platform employee, inspector, instructor, dispatcher and assistant superintendent. Good schedule man. At present employed on property operating 90 cars. Will accept position offering advancement. PW-703, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia.

MAN 18 years' experience in street railway work as superintendent and master mechanic. Age 38, open for position. PW-643, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila.

MAN, with 15 years' experience as general foreman and superintendent in street railway and lighting construction, is open for good proposition; can produce results. PW-716, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

MASTER mechanic, age 35; 15 years' experience maintenance railway equipment, including M. U. control and safety cars; personally first-class armature winder and machinist; excellent references. PW-721, Elec. Ry. Journal.

SUPERINTENDENT. Fully qualified in all departments; many years' experience in single track, high-speed, and city operation. Successful in handling labor and maintaining discipline. Now employed but desirous of bettering prospects. Requests the attention of presidents or managers having vacancies or contemplating changes. Excellent references from past and present employers. PW-638, Elec. Ry. Journal.

THOROUGHLY competent operating executive, now manager of small property, desires an opportunity to assume greater responsibilities, with better prospects for the future. Fully qualified in all departments. Most excellent references from present and past employers. Correspondence solicited. PW-637, Elec. Ry Journal.

BUSINESS OPPORTUNITIES

Automatic Car Fender

Opportunity for manufacturer to buy patent or manufacture and sell on royalty basis, an automatic, positive acting, Electric Car Fender, preventing loss of life or disfigurement. Merits fullest investigation. BO-723, Elec. Ry. Journal.

FOR SALE

Stock for Sale

55 shares of stock in National Railway Appliance Co. of New York, at a bargain price. W. McK. White, 6712 Cornell Ave., Chicago, Ill.

FOR SALE

Interurban Car

1—55 foot Combination Passenger and Express Car seating capacity 68. Built by Jewett Car Co., American Locomotive Trucks. Westinghouse No. 112 75 Hp. motors, double end control, 36 in. wheels standard gauge. Almost new and in perfect condition. Will make fine express car by removing seats. Available account too heavy for original purchaser's rails.

Immediate delivery—Indiana shipment
Will pass most rigid inspection.

Price, Indiana, $6,000

If interested write or wire.

Wood and Lane Company
St. Louis, Mo.

WANTED—TO BUY

4—G. E. 73—Railway Motors.
4—G. E. 87—Railway Motors.
2—G. E. 57—3-Turn Railway Motors.

L. G. VAN NESS
1431 Union Trust Bldg., Cincinnati, Ohio

WANTED

TWO ELECTRIC FREIGHT TRAILERS

Give full details, also best cash price, description and dimensions in first letter.

Rochester & Syracuse Railroad Co., Inc.
500 Syracuse Savings Bank Bldg. Syracuse, N. Y., J. H. Hickey, Purchasing Agent.

IMMEDIATE DELIVERY

Twenty-Five Cycle Rotary Converters

2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380-volts.
1—250-kw., 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380 volts.

Street Railway Motors

20—G. E. 800's, complete with controllers.

All in Splendid Condition

JOSEPH MYERSON, 411 Atlantic Ave., Boston 9, Mass.

What's Wasted Can Be Saved

We offer, at a most alluring price, one Scott Mineral Oil Extracting Outfit for the recovery of oily waste. Capacity approximately 3,000 pounds of waste and 5,000 gallons of gasoline. Apparatus consists of Condenser, Purifier, Extractor, Cooler, Separator, Storage Tank and Pump. It won't take long for this apparatus to pay its cost. Guaranteed in usable condition and offered subject to prior sale. May be inspected at our plant, Hopewell, Va. This is an opportunity for a quick buyer. Your wire will receive prompt attention.

DU PONT CHEMICAL CO.
Incorporated
WILMINGTON, DELAWARE

Caution—RAIL USERS

BUY NOW. There is a SCARCITY. We offer the following NEW RAILS for prompt shipment:

New 12-lb. and 30-lb. rails, splices, bolts and nuts.

New 90-lb. rails, angle bars, bolts, nuts and spikes.

They will be gone soon. Write or wire for our quotations.

Wire—300,000 lb. or more of copper trolley, feeder, high tension, etc.

A number of steel bridges on line of Cincinnati & Columbus Traction Co. For quick acceptance at $1.00 per 100 lb. as is. Photographs on request.

HYMAN-MICHAELS COMPANY

531 Peoples Gas Bldg., Chicago

BRANCH OFFICES: First National Bank Bldg., Pittsburgh, Pa.; Railway Exchange Bldg., St. Louis, Mo.; East Chicago, Ind.; New York: Woolworth Bldg.
YARDS AND WAREHOUSES: East Chicago, Ind. and St. Louis, Mo.

RAILS

New		Relay	
2000 tons	100's	350 tons	100's
1800 tons	90's	400 tons	85's
700 tons	85's		
430 tons	80's	300 tons	75's
200 tons	75's	1200 tons	70's
240 tons	70's	800 tons	65's
85 tons	65's	1500 tons	60's
450 tons	60's	4000 tons	50's

10 tons, 7 inch, 70 lb., Shanghai.
110 tons, 9 inch, 90 lb., Grooved Girder.
20 tons New 6 inch High T Rail Loraine Section 72-331
Other weights also carried in stock.

ZELNICKER IN ST. LOUIS

Get Our New Big Bulletin 285. Unusual Bargains in Railway and Industrial Equipment and Materials of every kind.

Some One Wants To Buy

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell It Before Depreciation Scraps It

THE SEARCHLIGHT SECTION IS HELPING OTHERS
—LET IT HELP YOU ALSO

0079

New—Used—Rebuilt
MACHINERY AND SUPPLIES
for construction and industrial work.

READING ENGINEERING CO., INC.
154 Nassau St., New York

CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

Get Our List and Prices.

J. F. DONAHOO CO., Birmingham, Ala.

NEW

80 lb. RAIL & ACCESSORIES

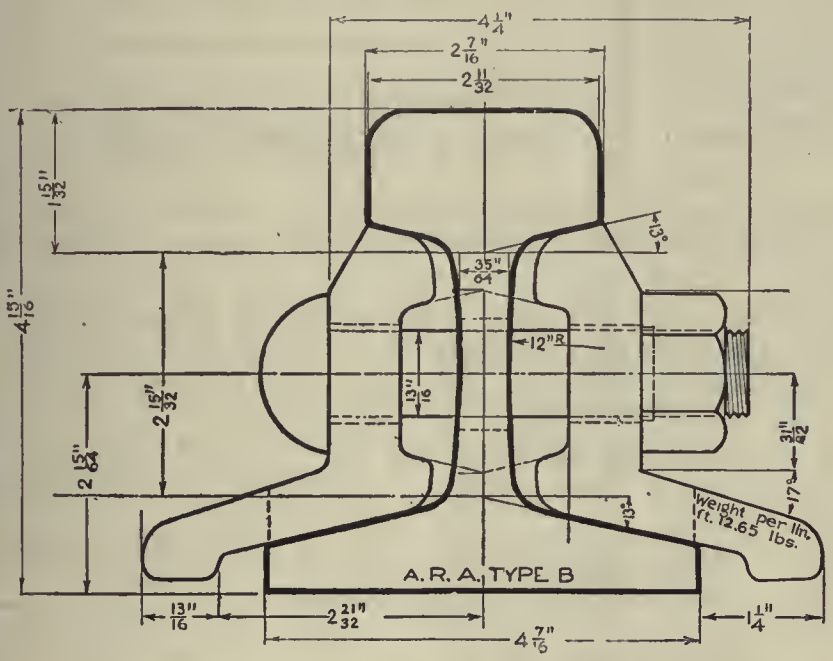
ANGLE BARS, SPIKES, BOLTS AND NUTS COMPLETE

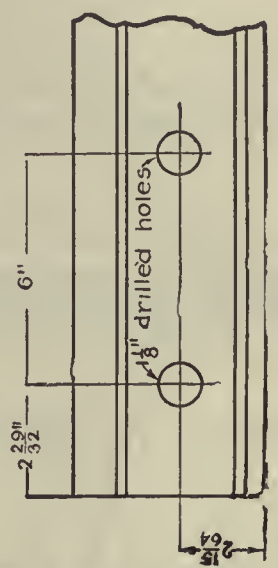
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A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, N. J.





Note actual dimensions of rail stated hereon.

HYMAN-MICHAELS COMPANY

Peoples Gas Building, Chicago, Ill.

New York Office
1324-1326 Woolworth Building

Pittsburgh Office
1312 First National Bank Building

We buy electric and steam railways that are to be dismantled

St. Louis Office
2115 Railway Exchange Building

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

FREQUENCY CHANGER SETS

1—600 kva., Allis-Chalmers Frequency Changer Set, 300 r.p.m., 3-phase, 60-cycle, 2300-v. one end, 3-phase, 6600-v., 25-cycle on other end.
1—400 kw., G. E., 3-phase, 25-cycle, 6000-v. one side—2400-v., 2-phase, 60-cycle other side—375 r.p.m.

ARCHER & BALDWIN, INC.
114-118 Liberty Street, New York City
Telephone 4337-4338 Rector

A Man Who is Now in Maine

may be

The Man You Need in Texas

The man for the job—wherever he may be—can be located through the

Searchlight Section

"SEARCHLIGHT" ads locate experienced men for responsible positions everywhere. They give a wide choice of candidates.

For Every Business Want
"*Think* SEARCHLIGHT *First*"

0134

Some One Wants to Buy

the equipment or machinery that you are not now using.

This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it *Before* depreciation *Scraps* it.

0178

MAC GOVERN & COMPANY POWER MACHINERY

114 Liberty St., New York, N. Y.

IMMEDIATE DELIVERY FROM STOCK

STREET RAILWAY MOTORS

34 Westinghouse No. 56, complete with gear cases, gears, pinions and axle bearings, gear ratio 16:66.

Further information gladly furnished upon request.

BRANCH OFFICES:
Pittsburgh, Pa.: 498 Union Arcade Bldg.
Seattle, Wash.: L. C. Smith Bldg.
Montreal, Que.: 285 Beaver Hall Hill

FOR SALE

6—50-FT.

Interurban Cars

Complete

Mounted on Standard C-60-P Trucks; 4. West. No. 56 Motors.

Electric Equipment Co.
Philadelphia, Pa.

FOR SALE

100-Tons

GIRDER RAIL

9 in. in depth, 141 lb. per yard. Prompt shipment.

R. D. TRIMBLE & CO.
Richmond, Va.

Generating Unit

We have for sale 100-kw., A. C., 220-v., 2-ph., 60-cy. generator direct connected to a Skinner automatic engine, 15-in. dia. x 14-in. stroke. This set is newly rewound and complete with switchboard and rheostat. Also switches, voltmeter and ammeter.

NATIONAL ASBESTOS MANUFACTURING CO.
Jersey City, New Jersey

FOR SALE

MOTORS

Two GE 150-hp., 25-cycle induction, type I-4-158-750, Form K—Amperes 176—Voltage 420—speed 750—equipped with base, pulley, and compensator; first class condition; immediate delivery.

ELGIN EDISON LIGHT CO.
Elgin, Ill.

"Opportunity" Advertising:

Think
"SEARCHLIGHT"
First!

0099

WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc Remember our initials stand for our product.

CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

Passenger Cars and Snow Plows
FOR SALE

Twelve—34 Ft., Easy Access double truck cars—"M." Control—will furnish trucks and motors if desired and put cars in good operating condition.

Two Hundred—25 Ft., to 30 Ft., double truck closed cars with vestibules platform complete with trucks, motors "K" control—ready to run.

These cars can easily be rebuilt for PREPAYMENT operation if desired.

Two Hundred—12, 13, 14 and 15 Bench double truck open cars—in good condition—with equipment if desired—available for immediate delivery—and ready to run.

A number of single truck SHEAR SNOW PLOWS—equipped with motor—ready for next Winter's service

TERMS—Cash or easy payments—Car Trust Certificates if desired

EASTERN MASSACHUSETTS STREET RAILWAY CO.

Address Purchasing Dept. **No. 1 Beacon Street, BOSTON, MASS.**

POWER PLANT EQUIPMENT
FOR IMMEDIATE SALE

GLOUCESTER, MASS.:
2—203 hp. B. & W. Water tube boilers
1—266 hp. B. & W. Water tube boiler
1—600 hp. B. & W. Water tube boiler
1—300 hp. 22 in. x 48 in. Harris-Corliss Single Engine
1—500 hp. 28 in. x 36 in. Hamilton-Corliss Single Engine
1—1500 hp. 30 in. x 48 in. x 48 in. Penn-Corliss Cross Compound Engine
1—250 kw. W. H. Belted Multipolar D.C. Generator
1—400 kw. G. E. Eng. Type Multipolar D.C. Generator
1—850 kw. G. E. Eng. Type Multipolar D.C. Generator
Switchboard and Misc. Auxiliary equipment

NEWBURY, MASS.:
3—115 hp. Kendall Horizontal Return Tubular Boilers
2—14 in. x 28 in. x 36 in. Slater-Corliss Cross Compound Engines
2—250 kw. W. H. Eng. type Multipolar D.C. Generators
Switchboard and Misc. Auxiliary equipment

ESSEX, MASS.:
2—150 hp. Kendall Horizontal Return Tubular boilers
1—150 hp. new eng. horizontal return tubular boiler
2—13 in. x 23 in. x 22 in. McIntosh & Seymour Tan. Com. High Speed Engines
2—220 kw. Walker Eng. Type Multipolar D.C. Generators
1—55 kw. G. E. Direct connected 200 volt Booster Set.
1—150 hp. New Eng. Boiler
Switchboard and Misc. Auxiliary equipment

LAKEVILLE, MASS.:
3—250 hp. A. & T. Water Tube Boilers
1—16 in. x 30 in. x 42 in. Hamilton-Corliss Cross Compound Engine
1—325 kw. W. H. Eng. Type Multipolar D.C. Generator
Switchboard and Misc. Auxiliary equipment

SALEM, MASS.:
1—2500 A.B.H. G. E. Curtis Horizontal 60 Cycle, 445 volts A.C. Turbo, Generator and Direct connected Exciter
1—Alberger Spiroflo jet condenser and Auxiliaries.

HYDE PARK, MASS.:
3—500 hp. B. & W. Water Tube Boilers
1—1500 hp. 30½ in. x 52 in. x 48 in. Penn Cross Compound Engine
1—750 hp. 20 in. x 40 in. x 48 in. Greene Cross Compound Engine
1—700 hp. 20 in. x 40 in. x 42 in. Penn. Cross Compound Engine
1—850 kw. G. E. Direct Connected D.C. Generator
1—525 kw. G. E. Direct Connected D.C. Generator
1—500 kw. G. E. Direct Connected D.C. Generator
Condensers, Pumps, Blowers, Boosters, Switchboard and Miscellaneous Auxiliary equipment.

Inspection Solicited—Details upon Application.

Terms Cash or Easy Payments. Car Trust Certificates if Desired.
Equipment released on account of purchasing power.

EASTERN MASSACHUSETTS ST. RY. COMPANY

Address Purchasing Dept. **1 Beacon Street, Boston, Mass.**

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Acetylene Service and Apparatus
Oxweld Acetylene Co.

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Track Specialties Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbit Metal Holding Compound
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Western Electric Co.

Batteries Dry
Western Electric Co.

Batteries, Storage
Electric Storage Battery Co.
Western Electric Co.

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Brady Brass Co.
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Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
Post & Co., Inc., E. L.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

Belt Fasteners, Lacing Hooks and Rivets
Crescent Belt Fasteners Co.

Benders, Rail
Niles-Bement Pond Co.
Track Specialties Co.
Western Electric Co.

Boilers
Babcock & Wilcox Co.
Boiler Cleaning Compounds

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.
Roller-Smith Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Oxweld Acetylene Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Western Electric Co.

Brake Adjusters
Gould Coupler Co.
National Ry. Appliance Co.
Smith-Ward Brake Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Ackley Brake & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Bricks, Fire
Green Engineering Co.

Bridges & Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan
Paxson Co., J. W.
Western Electric Co.
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morganite Brush Co.
United States Graphite Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
Flower, D. and B.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables. (See Wires and Cables)

Carbon Brushes. (See Brushes, Carbon

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
Osgood Bradley Car Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Ackley Brake & Supply Co.
Earll, Chas. I.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Checks, Employees
American Railway Supply Co.

Circuit Breakers
Cutter Electrical & Mfg. Co., The
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Western Electric Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Diamond Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coil Winding Machines
Diamond Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Combustion Systems
Engineer Co., The

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Mica Insulator Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Concrete Products
Massey Concrete Products Corp.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Schuttе & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Conduits, Flexible
Tubular Woven Fabric Co.

Conduits, Underground
Western Electric Co.

Connectors, Solderless
Dossert & Co.
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal and Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Eng. Co.
Portable Machinery Co.

Cooling Systems
Spray Engineering Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Gould Coupler Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Cross Arms. (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing)

Crossings, Frog & Switch
Wharton, Jr., & Co., Wm.

Crossings, Track. (See Track, Special Work)

Crushers, Lock
Allis-Chalmers Mfg. Co.

Culvert Pipe, Concrete
Massey Concrete Products Corp.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Edwards Co., The O. M.
Electric Service Supplies Co.
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg. Co.

Cutting Apparatus, Oxy-Acetylene
Oxweld Acetylene Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices. (See also Track Work)
Cleveland Frog & Crossing Co.
Wharton, Jr. & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Detective Service
Wish Service, P. Edward

Dispatching System
Western Electric Co.

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
Edwards & Co., The O. M.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Chicago Pneumatic Tool Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc.
Walter A.

Electrical Wires and Cables
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Arnold Co., The
Clark Management Corp., E. W.
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F-1

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Robinson & Co., Dwight P.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Engineering Corp., The J.G.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.

Engines, Steam
Allis-Chalmers Mfg. Co.

Extension Platform Trap Doors
Edwards Co., The O. M.

Fare Boxes
Brill Co., The J. G.
Cleveland Fare Box Co.
Johnson Fare Box Co.
National Railway Appliance Co.
Ahmer Fare Register Co.

Feed Water Heaters
Schutte & Koerting Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works
Western Electric Co.

Fibre and Fibre Tubing
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus
Castle, Inc., James M.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.
Western Electric Co.

Flooring, Grating
Irving Iron Works

Forgings
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track. (See Track Work)

Funnel Castings
Wharton, Jr., Inc., & Co., Wm.

Furniture, Metal Office
Edwards Co., The O. M.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Thayer & Co., Inc.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Ackley Brake & Supply Corp.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs)

Graphite
Morganite Brush Co.

Grates, Chain
Green Eng. Co.

Greases. (See Lubricants)

Grinders and Grinding Supplies
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
Railway Track-work Co.
Western Electric Co.

WHAT AND WHERE TO BUY

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle
American Bridge Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works
Western Electric Co.

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Hose
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Houses, Watchman
Massey Concrete Products Corp.

Hydraulic Machinery
Niles-Bement-Pond Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab'e

Institutions, Educational
Alexander Hamilton Institute

Instruments, Measuring, Testing and Recording
General Electric Co.
Roller-Smith Co.
Thompson-Levering Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instrument Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Mica Insulator Co.
Okonite Co.
Standard Underground Cable Co.
Western Electric Co
Westinghouse Elec. & Mfg. Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Insulations (See also Paints & Varnishes)
Okonite Co.
Western Electric Co.

Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Templeton, Kenly Co., Ltd.

Joints, Rail
Track Specialties Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Junction Boxes
Standard Underground Cable Co.

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
National Electric Specialty Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Dossert & Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr., & Co., Wm.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Machinery, Insulating
American Insulating Machine Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

Mica
Mica Insulator Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Motor Leads
Dossert & Co.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Allis-Chalmers Mfg. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Ohmmeters
Weston Elec'l Instrument Co.

Oils. (See Lubricants)

Oil Burning Equipment
Schutte & Koerting Co.

Oxy-Acetylene (See Cutting Apparatus Oxy.)

Packing
Post & Co., Inc., E. L.
Westinghouse Elec. & Mfg. Co.

Paints & Varnishes (Preservative)
Ackley Brake & Supply Co.
St. Louis Surfacer & Paint Co.

Paints and Varnishes (Insulating)
Mitchell-Rand Mfg. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Material
American Brake Shoe & Fdry. Co.

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers. (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Pneumatic Tools
Ingersoll-Rand Co.

Poles, Posts and Piling (Concrete)
Massey Concrete Products Corp.
Southern Cypress Mfg. Assn.
Western Electric Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co.

Poles & Ties Threaded
Western Electric Co.

Potheads
Okonite Co.

Power Saving Devices
Arthur Power-Saving Recorder Co.
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Pumps
Allis-Chalmers Mfg. Co.
Schutte & Koerting Co.

Punches, Ticket
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
Foster Co., L. B.
Lackawanna Steel Co.

Rail Grinders. (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Rail Welding. (See Brazing and Welding Processes)
Rail Welding and Bonding Co.

Rails, Relaying
Foster Co., L. B.
Zelnicker, Walter A., Supply Co., Inc.

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Recorders, Power Saving
Arthur Power-Saving Recorder Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Ahmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Rivet Heaters
American Car & Foundry Co.



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Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track. (See Cleaners and Scrapers, Track)

Seats, Car. (See also Rattan)
Brill Co., The J. G.
St. Louis Car Co.

Second-Hand Equipment
Archer & Baldwin
Cleveland Armature Works
Foster Co., L. B.
Hyman Michaels Co.
Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Western Electric Co.
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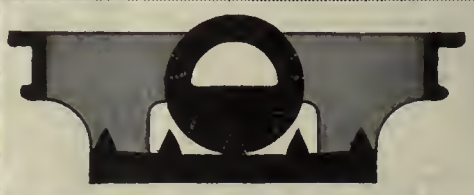
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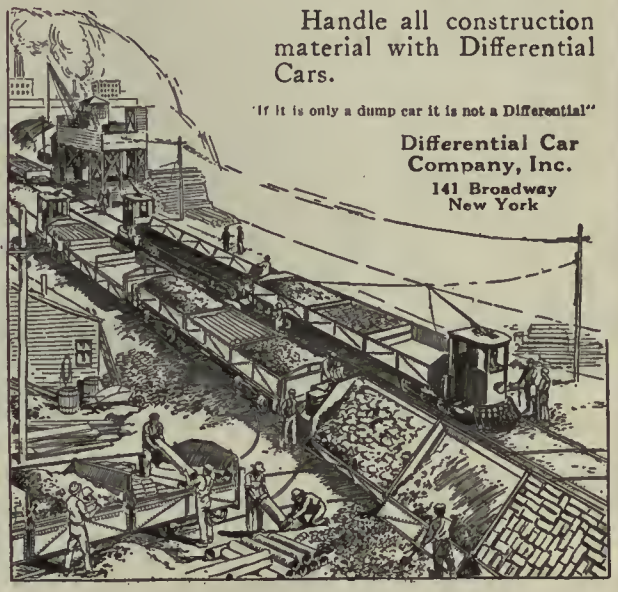
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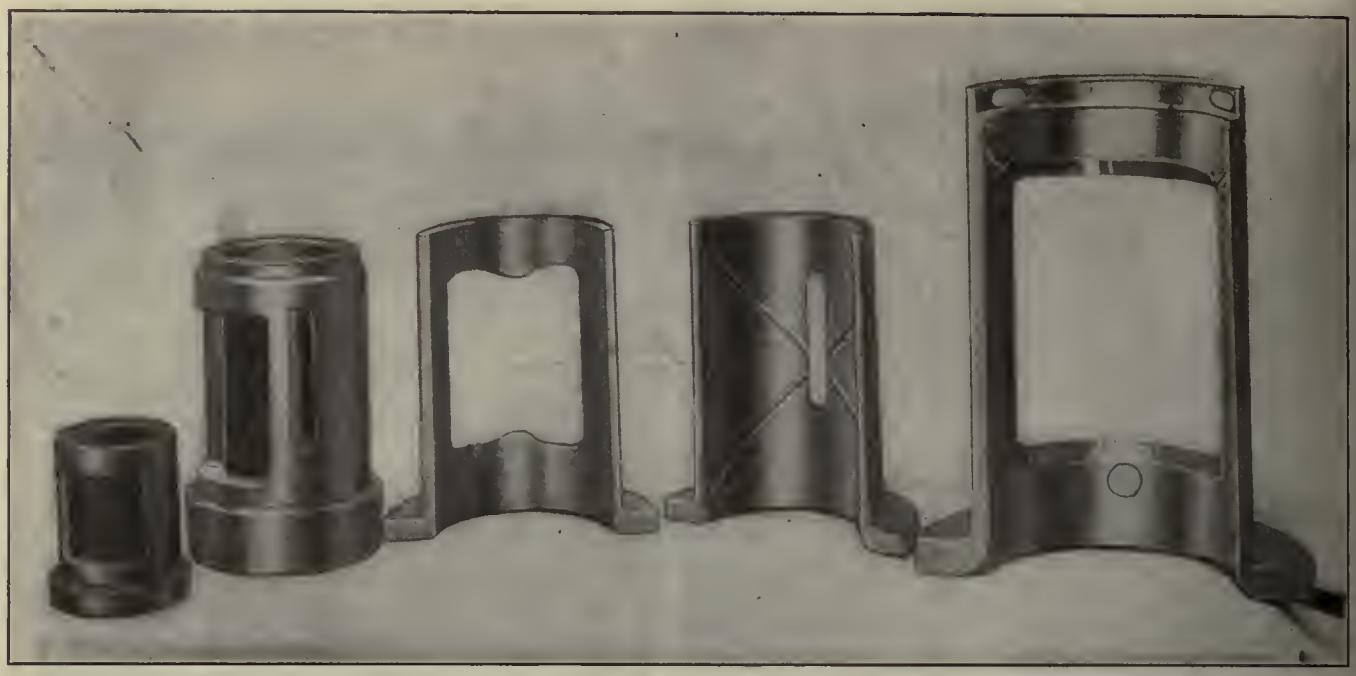
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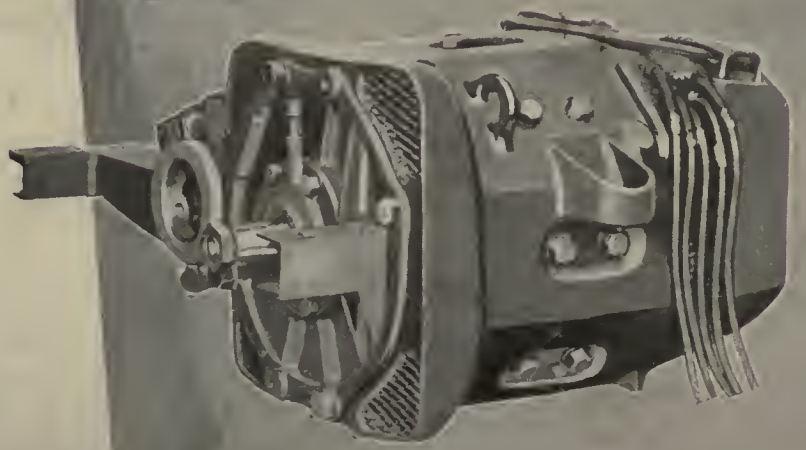
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ELECTRIC RAILWAY JOURNAL

McGraw-Hill Co., Inc. August 28, 1920

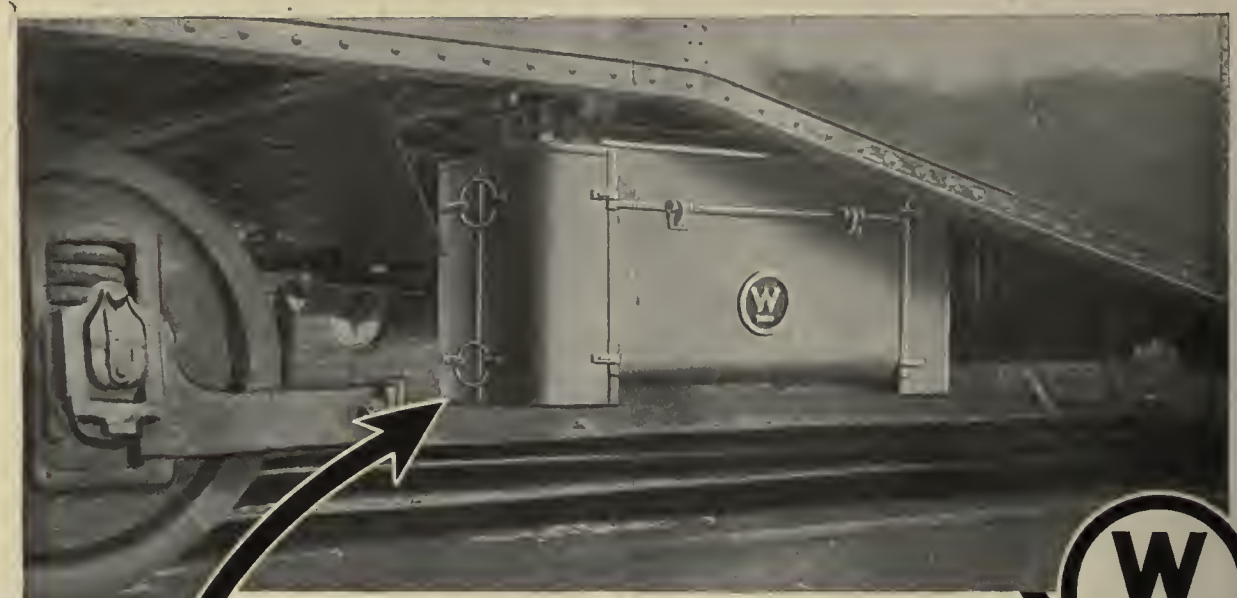


"CORLISS BRUSHES CARRY THE LOAD"

CORLISS CARBON CO. BRADFORD PA.

J. F. KERLIN PRESIDENT

PITTSBURGH CHICAGO NEW YORK



W
WESTINGHOUSE ELECTRIC

Simplicity and Reliability

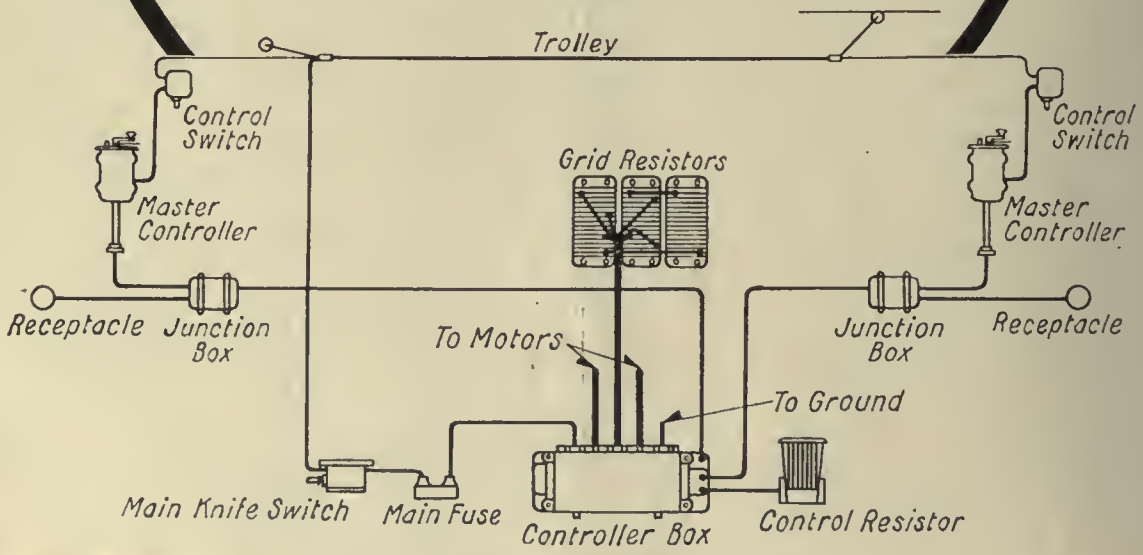
are the principal factors which contributed largely to the remarkable success of

HL Control

Among the most recent purchasers of this type of control are:

Dayton & Troy Electric Railway Company, 9 Equipments
Dayton & Western Traction Company, 2 Equipments
Cincinnati & Dayton Traction Company, 13 Equipments
Rockford & Interurban Railway Company, 5 Equipments

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



General Arrangement of Apparatus and Wiring

Westinghouse

Vol. 56, No. 9 New York, August 28, 1920 Pages 395-444

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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Complete text of the report made to the President as a result of 1914 hearings. Constructive suggestions are made to both railways and public. President Wilson suggests wide publicity for report.....Page 398

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Progress Made in Rail Joint Construction

R. C. CRAM describes recent developments in rail joint construction, which make this subject of particular interest, and a review of the progress made should be of benefit.....Page 415

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"A Chip Off the Old Block"

As a user of small turbines it is important to know that the troubles common to most small turbines have been prevented by embodying in the design of the small turbine those features which have contributed to the success of Westinghouse large units.

One of these features is that of eliminating turbine feet and supporting the turbine casing at the center line. This center support permits of uniform and even extension of the casing in all directions without in any way disturbing the alignment of turbine and drive shafts.

Leaflets 3867-A and 3869-A, fully describing our small turbine designs, will gladly be mailed upon request.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities.

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WESTINGHOUSE ELECTRIC

Westinghouse

High Vacuum Jet Condensers

Readily Adaptable To Changing Conditions

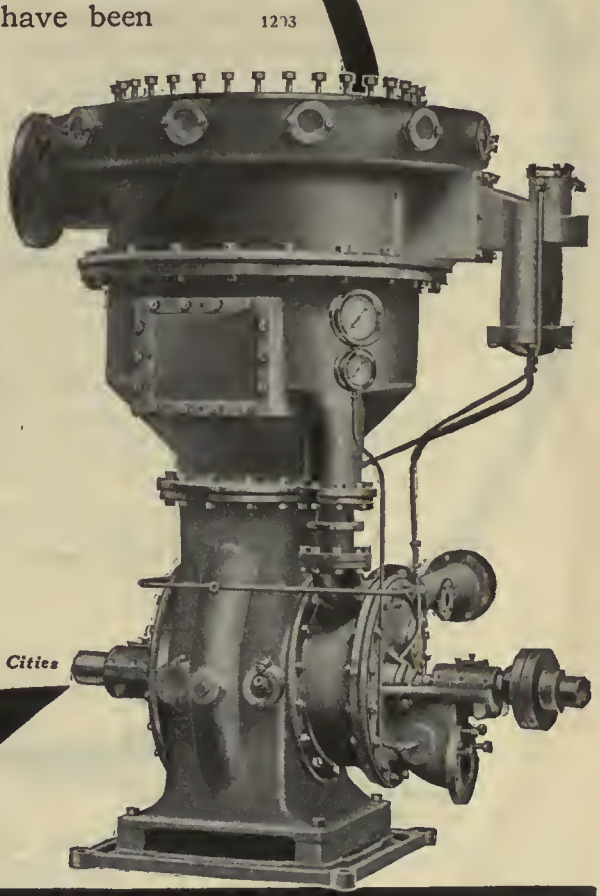
In addition to the high vacuum and guaranteed performance, there are other considerations which the condenser buyer should not overlook. Those who have investigated, have found that Westinghouse Condenser Designs have been developed to a point where they are readily adaptable to a wide range of variables in condenser practice.

Often the initial installation does not take into consideration conditions which may later cause a change in location of pump drives. In this respect, Westinghouse Jet Condensers are extremely flexible, provisions having been made for the easy and convenient location of the driving turbine or motor at either end of the driving shaft.

Ask our nearest district office for literature describing those considerations which we feel are of importance to the condenser buyer.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities



The shaft extension opposite the customary turbine drive, is arranged for a coupling, so that a motor may be conveniently installed if desired.

Westinghouse

Jet, Surface and Barometric Condensers

High Vacuum Jet Condensers

Readily Adaptable To Changing Conditions

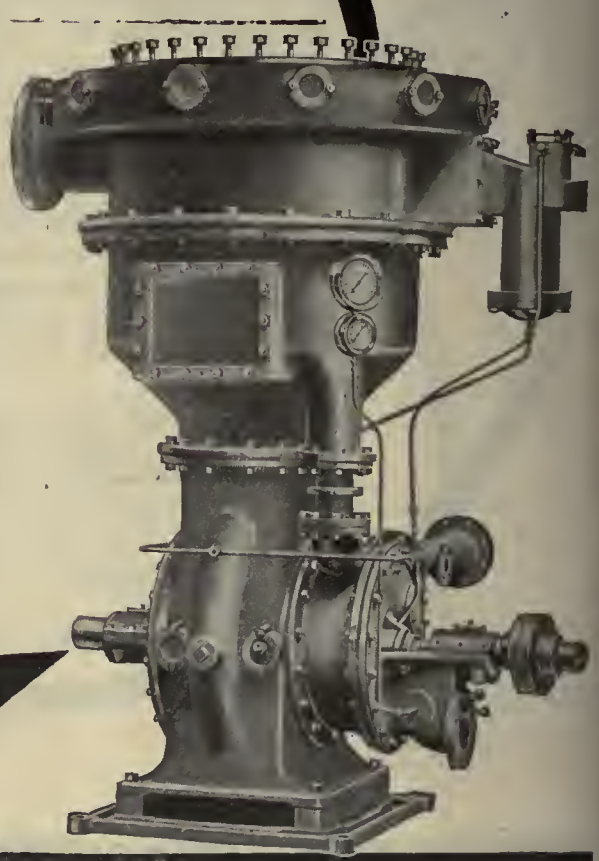
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The shaft extension opposite the customary turbine drive, is arranged for a coupling, so that a motor may be conveniently installed if desired.

Westinghouse

Jet, Surface and Barometric Condensers



One of the 200 new Brooklyn Rapid Transit "Safety" Cars, all of which are equipped with "Bungalow" air compressors.

"Bungalow" type air compressor

The "BUNGALOW" air compressor, essentially a "Safety" car machine, has been included in all the largest installations.

From the big metropolitan cities, where the greatest density of street car traffic exists, comes the most urgent call for air brake equipment that will give reliable service and insure freedom from traffic tie-ups and delays.

Such is Brooklyn, N. Y., for whose busy surface lines the Brooklyn Rapid Transit Company recently selected "Bungalow" air compressors for its entire number of 200 new "Safety" cars.

Over 3252 "Safety" cars now running on 182 different electric lines throughout the United States, are equipped with "Bungalow" compressors.

Brake Building Our Business for a Lifetime

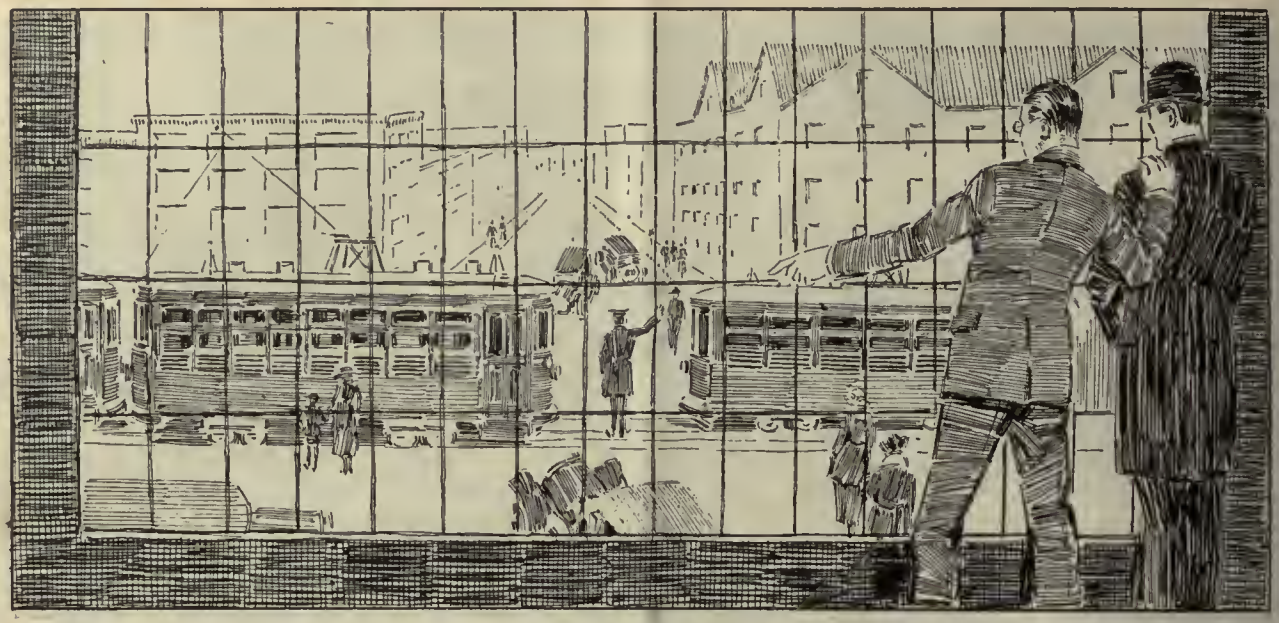
Westinghouse Traction Brake Company

General Offices, Pittsburgh, Pa.
Works, Wilmerding, Pa.

New York
San Francisco

Washington

Chicago
St. Louis



Said A Traffic Superintendent

"It's the Quick Stop and the Quick Start of the Safety Car

that have helped us to reduce the congestion on this street. With the old cars we would never get through the neck of the bottle fast enough. So much time was lost in closing the rear doors by hand, in getting the starting signal to the motorman and in notching up slowly on those old-time motors. And, of course, in making a stop the fact that we had old-fashioned brakes and a heavy car didn't give us the chance of slipping by a crossing just before the cop put on the 'Stop-Stop.'

"Those seconds gained here or there may not seem much to you, but they count up in the course of the day's work of a car, believe me.

"With the front-entrance operation of these Safety Cars, there's no chance for slack in the interchange of passengers. The door is closed by air, the very moment the last passenger's aboard. There's no waiting for signals from a conductor, either. A wave of the hand from the traffic cop and zip!—there she goes across with a faster getaway than many a gas wagon.

"Some car, boy, some car!"

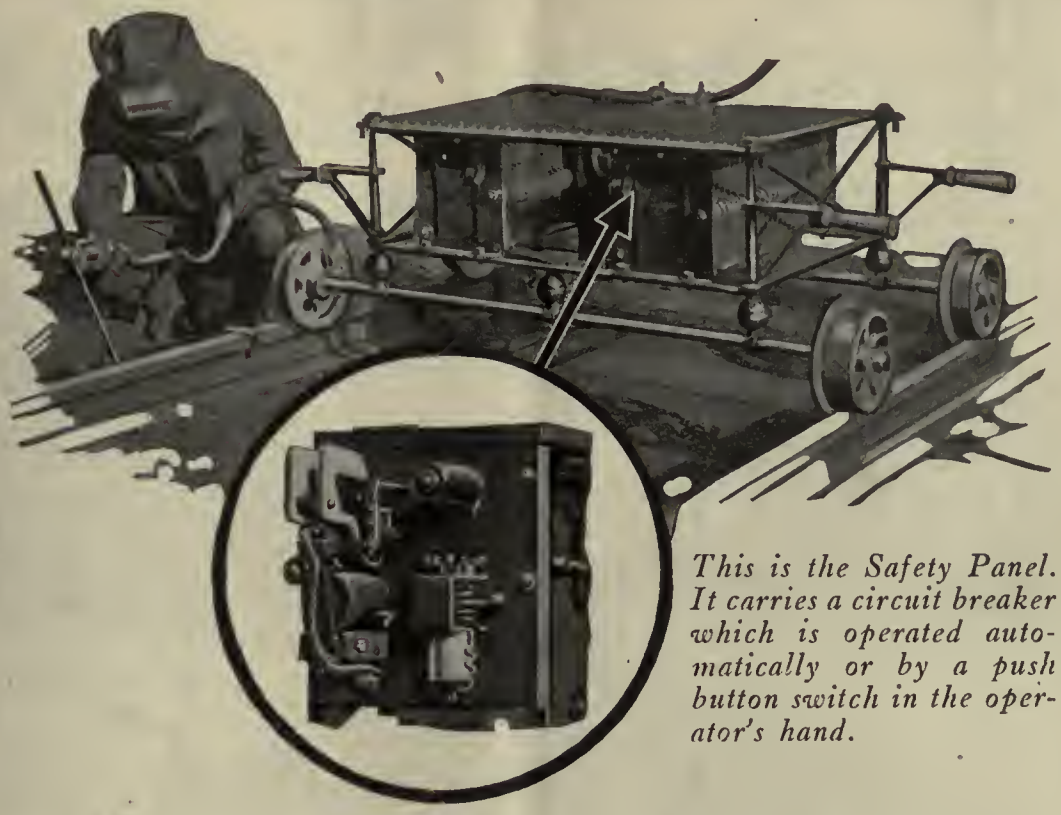
Is a Safety Car *because*

it is equipped with automatic, laborless apparatus so interlocked, that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the airbrakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO Railway Exchange Bldg.
WASHINGTON, D. C. Munsey Bldg.
NEW YORK City Investment Bldg.
PITTSBURGH Westinghouse Bldg.
SAN FRANCISCO—Southern Pacific Bldg.
CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



This is the Safety Panel. It carries a circuit breaker which is operated automatically or by a push button switch in the operator's hand.

Bonds for Economy

A large railway wrote as follows:

"During the present extreme high prices of coal and the necessity for closing up all current leaks on all systems, we expect to make a test on our bonding layout."

Good bonding is most essential when money is scarce. Keep bonds on the budget.



O-B Type AW3 Patented

Building a Hard Working Helper Into a Machine

On the O-B Resistance Welder is a safety control panel which does nearly the work of an extra man.

When he's ready to start welding the operator presses a push button switch—right in his hand. Immediately the automatic "helper" turns on the welding current.

When he wants to stop he clicks the switch again. And the "helper" cuts off the current.

If a short circuit or overload occurs the alert mechanical watchman opens the circuit.

Because the welder has such a helper who always obeys, who never misunderstands, the work progresses rapidly and with safety.

This same principle is applied to O-B Bonds. The four fundamentals make it easy for the operator to do good work in a short time.

That's why we say:

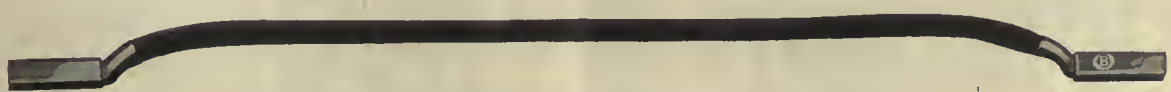
"Half your bonding is done at the factory when you do O-B Arc Weld Bonding."

"Electric Arc Weld Bonding" will interest you. Copy on request.

THE OHIO BRASS COMPANY

Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles



O-B AW-2 Bond—Patented

Phono-Electric

Never Fears the Micrometer



7 miles of Phono-Electric on the Esplenade Belt Line. Installed 6 years ago.

It has been the regular practice on the New Orleans Railway & Light Company lines to micrometer trolley wire every six months at three points on each span.

One man takes from nine to ten weeks to carry out this job with the accuracy demanded.

It is this attention to the important matter of longevity that has helped the New Orleans Company reach the decision that

Phono-Electric Wire was a worthy standard.

Bridgeport Brass Company

Bridgeport 2120 **Connecticut**



63% for Bearing and 37% for Reinforcement

IN Steel Twin Ties the economical distribution of Steel under the work a tie is called on to do takes these percentages.

The larger proportion of the Steel goes into the Three-Foot by Thirteen-Inch Bearing Plates, which are Five-sixteenths Inch thick. Flanged sides provide for stresses in the plates and in combination with the Three-Foot-Long Bearing utilize all the Steel in them.

The smaller, but equally important, proportion goes into the Three-Inch Channels, which weigh Four Pounds to the foot.

They space the rail so accurately that no gauge is needed in laying Steel Twin Ties.

They also reinforce the track foundation at Three-Foot Intervals.

This efficient distribution of Steel is the fundamental principle of permanent, proved construction at less first cost than wood tie probabilities.

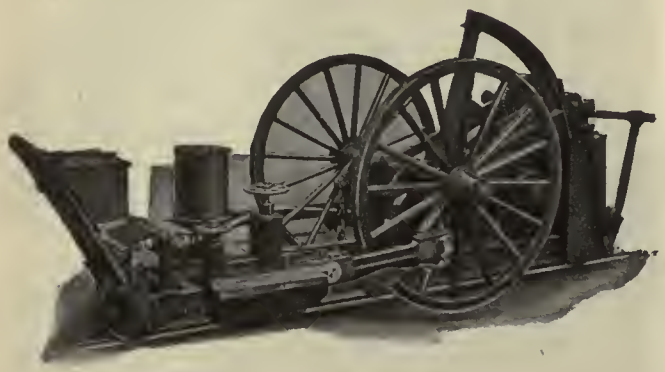
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

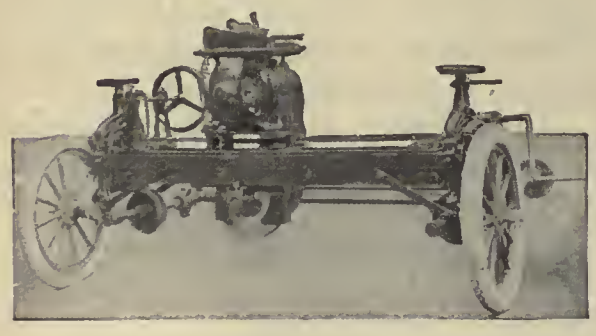
16702 Waterloo Road CLEVELAND, O.

Steel Twin Tie Track

WHEREVER TRACKS ARE GROUND







special problems are encountered. It may be rail corrugation, low or cupped joints, welding repairs to switches and to mates or building up miles of badly worn track with arc welding.

Many conditions govern the requirements of any railway in the market for grinding equipment.

The choice of a grinder or grinders is influenced by the number of miles of track, cost or labor, headway, and location whether in large cities or small towns.

The Railway Track-Work Company has three different grinders which individually or collectively will solve every problem of grinding on any electric railway in the United States or abroad.

Let us explain in detail.

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

EXCLUSIVE AGENTS:

ATLAS RAILWAY SUPPLY CO. Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO. Pittsburgh, Pa.

CHAS. N. WOOD CO. Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc. 77A Queen Victoria St., E. C. London, England

These Keystone Specialties are Standard Equipment on nearly all Safety Cars.



Golden Glow Headlights



Keystone Rotary Gongs



Keystone Air Sanders



Keystone Trolley Catchers



Faraday Car Signal Systems



Keystone Steel Gear Cases



Keystone-Hunter Destination Signs

Always specify them for they will serve you well. Write for Bulletin No. 167, showing many other Keystone specialties for use on safety cars.

Keystone Trolley Catchers



If you have "inside information" about these catchers you'll know that they work. From the outside there's nothing to be seen but a round iron case with the Keystone name on it but behind the name are the "works"—the centrifugal pawls that catch the rope an instant after the wheel leaves the wire, without rebound or wear on the rope as the check operates on a drum and not on the cord itself. These catchers save the shocks on the overhead equipment, the conductor's time and shorten car delay stops. Nothing to monkey with or get out of order and they are standard on the safety car, of course.

ELECTRIC SERVICE SUPPLIES CO.

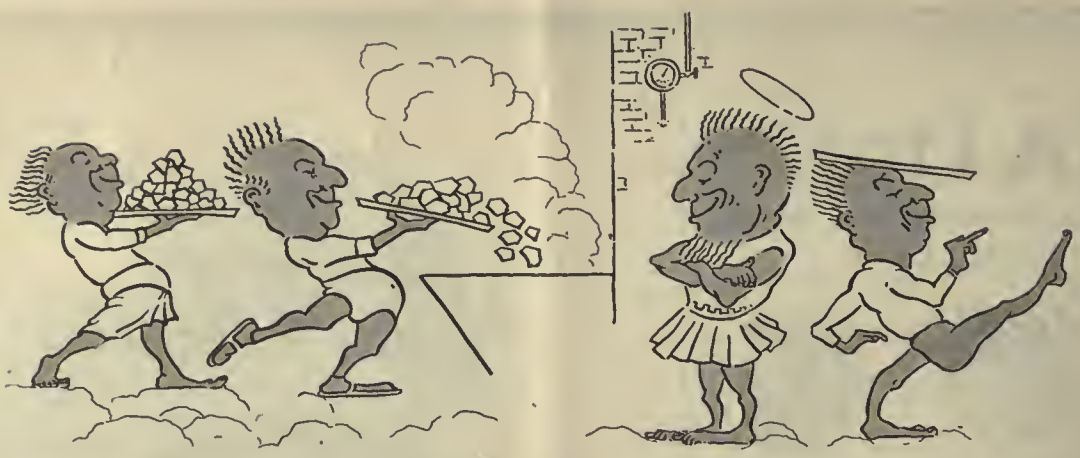
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

CHICAGO
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto



CHAPTER SIXTEEN

THE ALL-*BUT* PERFECT STATE

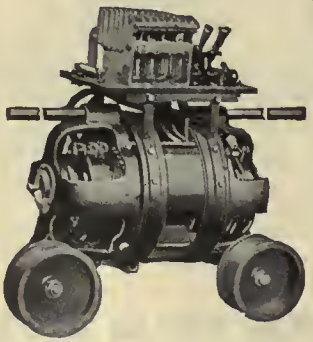
They shall find gold in fine coal

If there be one word that describes the conditions in the All-But Perfect State—that word is SAVE.

Chinks that ordinarily form drains on power will be carefully calked.

They shall go to the mine mouth where millions of tons of coal presumed, in the men-lightened age, to be of no value on account of fineness, have been dumped and they shall grind it finer and use it and frown on stock jobbing schemes for reclaiming this waste in the form of briquettes.

And this form of approved practice in saving shall obtain along the lines to the very bonds, for there too, they will find that advanced practice in applying the bonds by means of the Dynamotor carries a saving which pays for the equipment. This will obtain for the reason that the motto of wads will be "A penny saved is a penny earned"—and leave it to any manager to keep an eye on earnings.



READING NO. 16

Q. Where should one look for a saving in bonding—to the bonds or to the method of applying?

A. Look to both. Lincoln Continuous Bonds assure a saving—and applied with the Dynamotor a further saving is secured, so why not go the whole way?

Rail Welding and Bonding Company

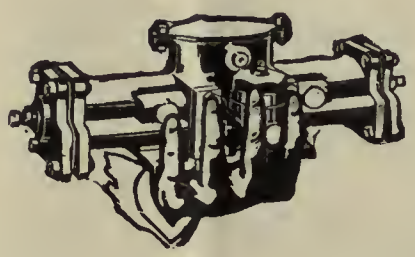
formerly The Lincoln Bonding Co.



Cleveland, Ohio.

NATIONAL PNEUMATIC

Standardize! *Pneumatize!*



To Get This Speed

The very instant you hear the click of the closing door, you *feel* that the car is on its way.

The conductor doesn't stop his collection of fare to tug at door levers and to pull at bell cords; nor does the motorman's brain require the hundredth of a second to comprehend and put the starting signal into *action.*

Nothing so slow is necessary when the unlimited power of compressed air and the lightning speed of electricity are there to do the work as embodied by

National Pneumatic Door and Step Control with the exclusive Safety Interlocking features that start the car automatically and instantaneously from the first notch of the controller.

Make Your Peak Periods Produce Maximum Profits and Efficiency

National Pneumatic Company, Inc.

50 Church St., New York Edison Bldg., Chicago

Works: Rahway, N. J.

Metal tokens mean economy

The frequency with which the rate of fare is being changed all over the country, sometimes 3 and 4 times in a year on the same property, gives great prominence to the heretofore minor question of

What Kind of Tickets?

Metal Tickets

offer so many advantages that we believe we are not over-zealous when we urge that no company with a fare above 5 cents can afford to be without them.

With a multiple coin fare—

(a) If no tickets are being used, a very significant money loss is going on constantly through the prolonged standing time of cars which results from the complication of collecting odd fares.

(b) If other than metal tickets are being used, the cost is far greater than the cost of metal tokens, and there is the further loss of undue cost of handling in the Accounting Department.

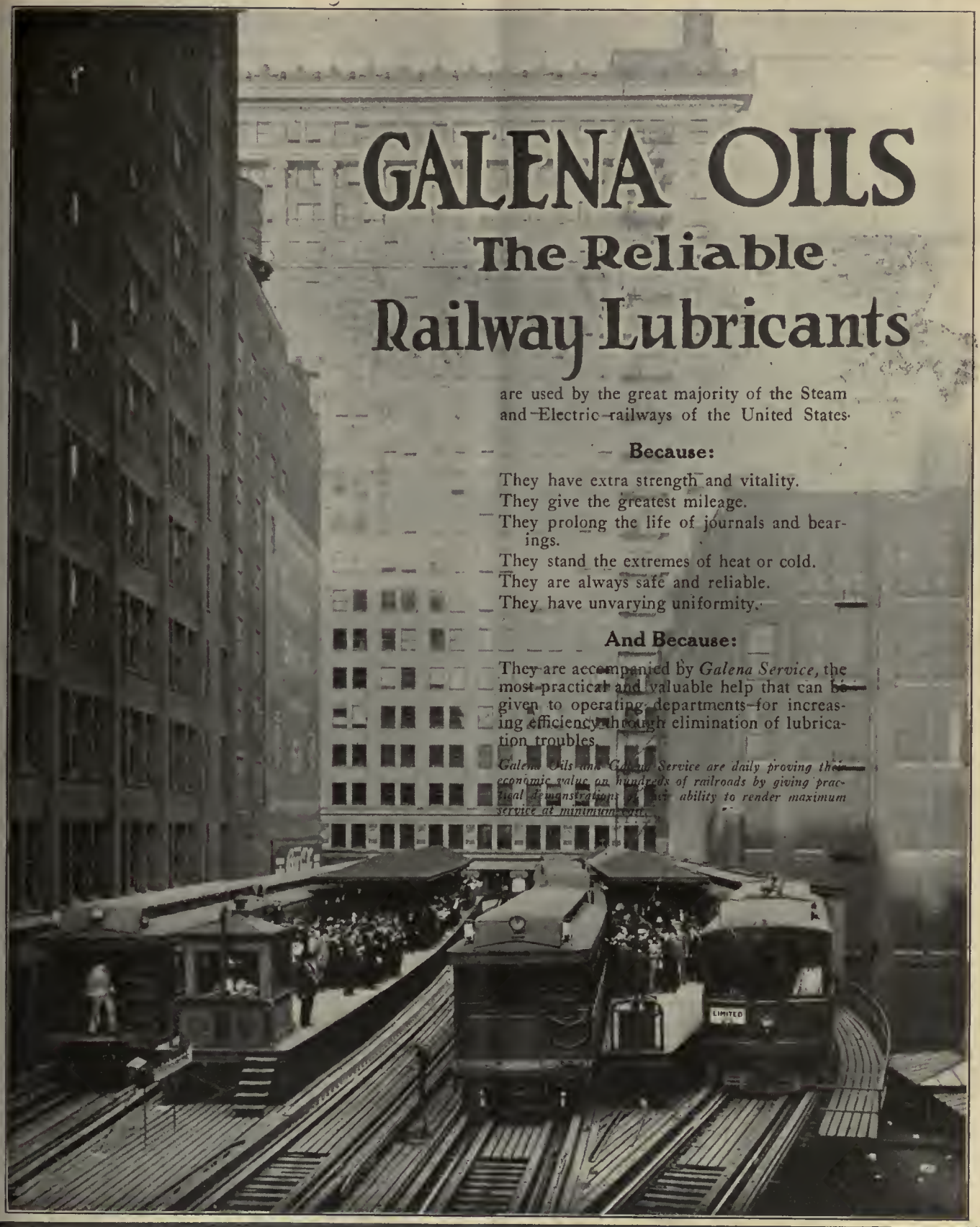
The use of metal tickets will bring a substantial economy to any street railway, whether the cars are equipped with no fare boxes, locked boxes, or registering fare boxes. But good as this economy is in itself, it is only a beginning on the saving that can be had bv equipping the cars with

Johnson Fare Boxes

whereby the time saving advantage of the old unit fare can be retained and the even greater advantage of immediate registration obtained.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.



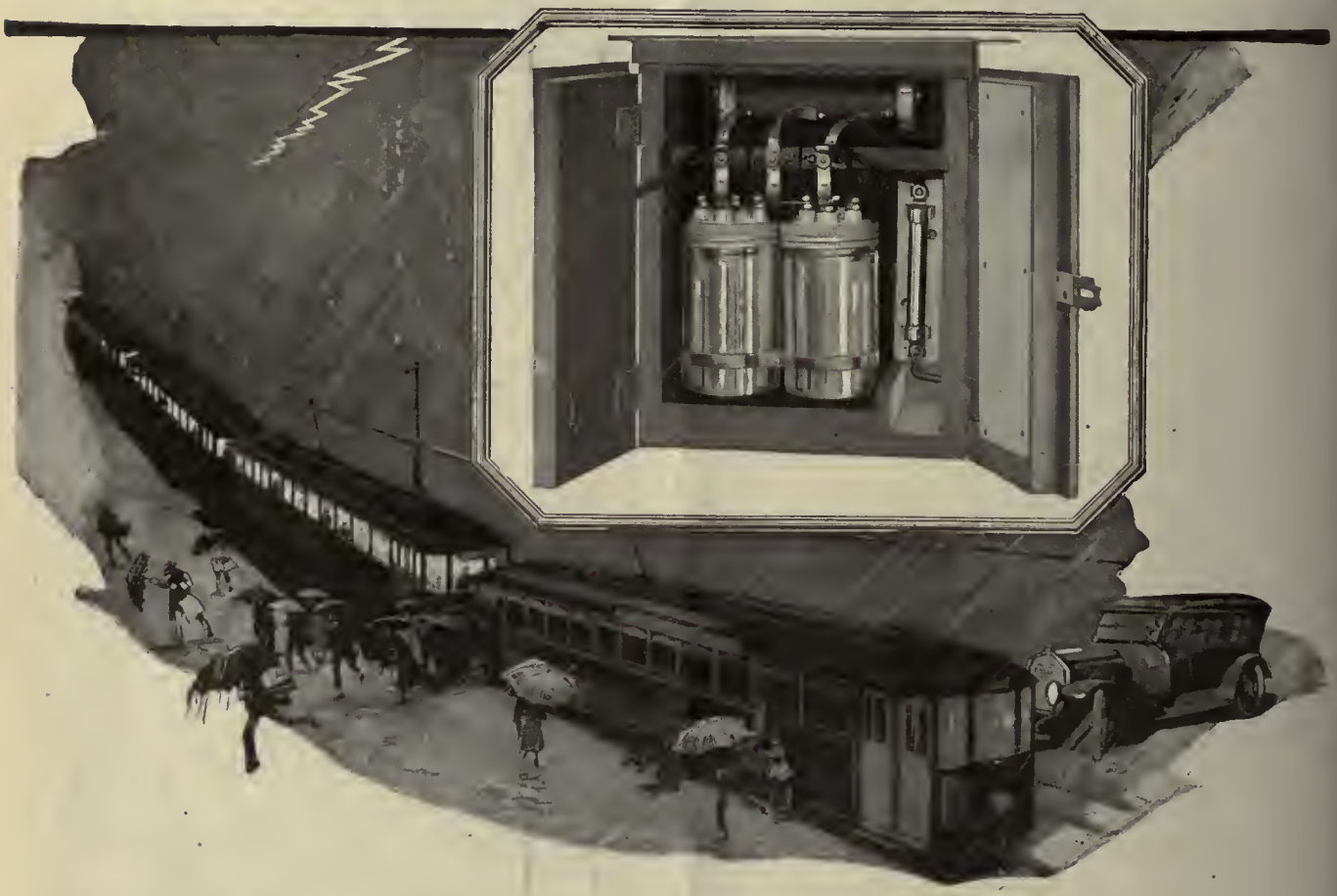
Galena-Signal Oil Company

New York Franklin, Pa. Chicago

and all principal American cities

LONDON TORONTO BUENOS AIRES MONTREAL PARIS

Why risk a loss when such a simple, economical and efficient protective device is available?



Protect Your Service

How often it happens that the most severe electrical storms break just at the heavy traffic hour.

One car put out of commission then causes congestion—delay—loss of fares—irritated patrons.

You surely cannot afford to lose any of the public's good will, or any of its patronage.

G-E Aluminum Arresters

installed on your cars will make it possible for you to continue operation throughout the heaviest lightning storms, in safety. Do you realize how soon the lightning storms will come?

33E-14

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 56 New York, Saturday, August 28, 1920 *Number* 9

The Federal Commission Has Produced a Constructive Report

MOST important, probably, in the ultimate salutary effect of the report of the Federal Electric Railways Commission will be the general sentiment of the report that the problem of bringing the local transportation utilities to a position of greatest usefulness is one for the joint solution by the utilities themselves and the public. Quite definitely and, we believe, most fairly, the commission points out the obligations, duties and opportunities of both the railways and the organized public.

The report has lost some of its effect on account of the time which has been allowed to elapse since the hearings were held and the subject was more alive in the public mind. But wherever sober-minded students of the question are really trying to adjust relations, legal, financial and social, so that the railways may function most properly, we believe this report will prove to be a valuable aid. The very fact that this is the combined and unanimous judgment of so representative a group of men, after considering the immense amount of testimony and data presented to them, gives the report well-deserved weight and commands respect.

The report may not be perfect, but it is essentially sound and it is constructive. On the whole it analyzes the situation fairly, and it performs the even more important service of pointing the way to better conditions. There are railway men, there are labor men, there are members of the public, the last chiefly uninformed or politicians, who will disagree strongly with some of the recommendations and object to some of the analytical statements. We are inclined to the belief, however, that the report is not only right but stronger for having these very recommendations and statements included, and, further, those who object will, in the abstract and if the pinching shoe is removed, agree to the principles which they are at first inclined to criticize.

If there is one point to which we ourselves, succumbing to the admitted human weakness, would call attention, it is what we believe to be too great a conservatism in the estimate of the financial needs of the industry. From studies made as late as 1918 it was said that history showed the industry to need $500,000,000 to $600,000,000 new capital for replacements, extensions and improvements in addition to refunding requirements which were approximately half as much. While the latter sum does not of course represent additional investment in the electric railway industry, it is none the less an essential capital requirement which must be obtained if the industry is to develop. The commission states that it makes a "conservative estimate" when it gives its figures of $175,000,000 to $200,000,000 and our remarks are merely to emphasize how "conservative" these figures are.

Most of the principles discussed are not new to railway men, but the clearness and carefulness with which recommendations are made or conclusions drawn are worth special notice. We would call attention to I, the essentiality of rail transportation; VI, the combined duty of furnishing adequate economic service by the railways and of allowing a reasonable return on a fair value by the public; VIII, the necessity for the removal of public antagonism (which we take to mean, as well, elimination of politically inspired persecution), encouragement of public co-operation and insurance of integrity of investments; XI, the recognition of the unregulated jitney competition and the necessity of providing regulatory provisions equivalent to those to which railways are subject; XII, the right of labor to satisfactory living conditions and collective bargaining, but the duty of labor to co-operate; the necessity for arbitration or other lawful means of settling disputes and the intolerableness of strikes and lockouts; XVIII, the recognition and recommendation of the service-at-cost franchise based on fair valuation as "one means of solving a very difficult problem," and XX and XXI, the great desirability of properly regulated utilities rather than a resort to municipal ownership.

It is interesting and instructive to note in connection with the last subject that, although the commission in its letter states that "owing to the divergent representation of its personnel this unanimous report of the commission necessarily represents decided concessions by some of its individual members," it says in discussing government ownership that "each member of this commission believes that credit can be secured and private operation maintained under proper public supervision."

THERE are one or two points in the analytical discussion which deserve special attention. One of these is that, while what the commission says is true regarding the strength of the industry in having a market which pays cash as it goes, and in having a monopoly, nevertheless, this is also a weakness, for there is no possibility of "storing" the manufactured product. If the transportation is not sold as produced its cost is a dead loss. Another subject to which considerable attention is well given is the suggestion that extensions should be financed, at least in part, by assessments on property benefited. While the commission quotes sewers and pavements as examples, we would also mention water, and frequently the first cost, sometimes later amortized, of extensions to electric light and power, water, telephone, gas, etc. And finally the commission points out the close relation between public health and public economy—the social element, in other words—and transportation.

The national importance of the subject is well emphasized, but, even though there were some suggestions during the hearings that the national government might take a hand in the game, it is evident from the President's letter that the solution must come through local developments, as is probably necessary.

How can the report become really effective? is the next question. As we see it, the advice of the President should be followed; namely, get the facts to those interested, and these facts are most fairly set forth in the report itself. As we have said above, the report becomes a valuable aid. But railway men cannot, on that account, sit back and expect the situation to clear up automatically. The report emphasizes the duties of the railways themselves, but at the same time gives them most effective assistance.

Finally, we believe that the statement that "The electric railway problem admits of a satisfactory solution once the elements that compose it are made known and the principles of ordinary economic and business common sense are applied"—a statement already eagerly grasped by the daily press—can well be used by railway men and others interested to urge upon their fellows that men of good business judgment be elected to political office. For, as the report so ably points out, much devolves on the organized public, and we need sensible men in office to perform the work of the public.

Economic Conditions Increasingly Favor Electrification of Steam Railroads

IT IS now some time since any important announcement regarding steam railroad electrification has been made. This has been due to the condition of the industry, not to lack of interest on the part of railroad managers and engineers. A sound 25 per cent investment possesses no attraction for the moneyless individual and an offer of a means of increasing track capacity at small cost or of reducing fuel consumption falls upon deaf railroad ears when the treasury is empty. But now that the railroads are to have a square deal as to rates conditions will be changed and they can be reasonably expected to enter upon a constructive electrification program in due course.

Our view of this matter was indicated in an editorial in the Aug. 7 issue, written soon after the decision of the Interstate Commerce Commission to increase freight and passenger rates had been announced. The point made was that with the higher rates railway income and especially railway credit should so improve as to make judicious electrification possible. The reasons for ultimate electrification are so many and potent, however, that the forward-looking railway men and the makers of equipment who see large markets for their products in this field can afford to be patient.

Of course, the steam railroad properties are very much run down and are short of needed steam equipment, hence much of the available money at first will have to go to supply the deficiency. At the same time, the possibility of electrical operation, either by locomotive or multiple-unit cars, brings a new element into heavy traction, permitting some things to be done that could not be done at all before and making economies possible along other lines. Hence the sooner the job of electrifying the steam roads is tackled the better.

As we see it, the electrification proposition divides itself into three phases: namely, a first, in which electric power is applied in places where there is no possible competition with steam; a second, in which the electric locomotive or multiple-unit train is admittedly superior, and a third, in which there is competition, which will become keener as time goes on. As examples respectively of these phases it is only necessary to cite the Grand Central Terminal in New York City, the Pennsylvania Railroad Broad Street Terminal in Philadelphia, the Norfolk & Western or the Butte, Anaconda & Pacific, and the Chicago, Milwaukee & St. Paul electrifications. These and other examples which will automatically occur to the mind are harbingers of the electric age to come.

Credit and Transportation Are Partners

IT IS about time for harvests and crop movements. Crop movements necessitate adequate transportation facilities and a large volume of credit is needed to finance crop marketing.

Since last November the Federal Reserve Banks have limited loans and tried to reduce the outstanding credit volume, but with little effect. For the past year the railroads have been devoting their attention to the imperative transportation demands, also with little effect, because of lack of credit and equipment.

The outstanding credit in July exceeded that at the close of 1919 instead of being lowered, and the financial men say this was largely due to inadequate transportation facilities, which obstructed free movements of commodities.

To an unusual degree crops will have to be held by the producers this year, this because of lack of cars and because of an 8 or 9 per cent money rate on time loans.

It seems to us self-evident that the transportation system and the banking system are mutually dependent. Give the railroads and railways credit and transportation facilities will soon be made adequate and the credit volume of industry reduced.

The intelligent method to reduce credit volume is to insure rapid commodity movement; the foolish method is to reduce production and the volume of business. Which is this country trying to apply?

Progress in Rail Joint Construction

THE subject of rail joints never seems to lack interest on the part of maintenance engineers. This is largely due, no doubt, to the fact that in many instances the joints are so obviously present that they cannot be overlooked. However, a study of conditions on any road will generally indicate that those joints which are still "among those present" are not in the class of modern joints. The term "modern" has to be defined here and we shall define it as covering the period of the last ten years.

Modern rail joints are the product of a long and costly process of evolution and we cannot say that they have reached perfection. Nevertheless, the study and experiment which have been devoted to them in the past decade have led to marked progress in that direction. Among other features, the progress which has been made in the several forms of welded joints for steel work is particularly striking, and it may safely be said that the welded joint has come to stay. Just what particular type of weld will ultimately reign supreme as the acme of perfection cannot be predicted, principally because of the element of time required to prove the ultimate worth of any joint.

The general acceptance of the welded joint as the proper type to be used for street work marks a very

important step in the progress of the art of track construction. With this question apparently settled, the next step will probably involve the gradual elimination of one or two of the types of welds now in use and, perhaps, the general adoption of one or more others which have some vogue today. It is quite possible that we may continue to have more than one type of welds to select from as the needs of the work indicate.

It is to be hoped that in our search for perfection in welded joints we shall not be too hasty in the extensive adoption of types which must still be classed as in the experimental stage. Some of the older types of welded joints which are now enjoying a great degree of success are the result of many expensive experimental installations undertaken without definite information as to performance over a period of years under service. The cost to the railway companies of the information thus gained is incalculable. The information contained in the article on rail joints in another part of this issue and covering the details of progress in several older types of welded joints should at least serve to caution engineers against too extensive experimentation with newer types until more is known as to service results extending over five years or more with the older types.

Electric Locomotives Prove Sturdy Under Strenuous Circumstances

AFTER several years of uneventful but eminently satisfactory service on the Rocky Mountain section of the Milwaukee electrification, three of the ten General Electric locomotives which were some months ago transferred to the Pacific Coast section, from passenger to freight duty, were soon thereafter given some jolts which severely tested their ruggedness. The story was told in last week's issue of this paper. Within a few weeks of each other two wrecks occurred in which these locomotives figured, but for neither of these were they in any way responsible. Minimizing the risk of repetition of the accidents will consist simply in increasing the preventive measures against man-failure and landslides, dangers which are necessarily incident to the railroad business.

The most remarkable thing about these wrecks is the way in which all three locomotives came through the ordeal. On the runaway train the main stress was on the motor armatures, geared as they were for a reasonable freight train speed. As the centrifugal forces vary as the square of the speed this inadvertent overspeed test involved forces which may be assumed at four times the normal value. Under these forces only one armature burst. The bars of several commutators "started," but the motor damage, as well as that in other parts of the machine, was insignificant compared with the wreckage as a whole. And the way this locomotive "hugged" the track was most remarkable of all.

This accident furnishes an ocular demonstration of the forces which are present when heavy trains are operating on steep grades. That of Beverly Hill is 2.2 per cent. Allowing 8 lb. per ton for friction, each ton on this grade produces a force of 36 lb. along the track, or a force of 100,800 lb. for a train weighing 2,800 tons, about the weight of the ill-fated wrecked train in question. It is easy to imagine what damage such a force, acting unrestrained upon even so ponderous a mass, could inflict. It inflicted it, all right, but of course the track curves must be credited with much of the damage.

And then, those locomotives that rolled down the bank; they proved themselves rugged even more surely. Locomotives must be designed for overspeed but hardly for overturn, at least not to this extent. The cabs were of course badly damaged, necessitating rebuilding, with straightening of some plates and replacing of others. There were also some minor breakages; but on the whole the damage was smaller than would be imagined possible and the reasonableness of the actual salvaging cost surprised the experts. That electric locomotives can be successfully salvaged after rolling down an embankment was proved years ago when four Great Northern machines were unceremoniously upset in this manner by an avalanche near the Cascade tunnel within a hundred miles of the scene of the Milwaukee accident. It is idle to speculate on the cost of salvaging Mallets under the same circumstances, but one cannot help but give this speculation a passing thought.

The Millennium Is Not Yet

WE RISE to remark that the statement that the motor bus will prove a panacea for all transportation ills can now at least be questioned. The news, as noted in this issue, of the strike of nearly 1,000 motor bus drivers in California indicates that labor will still be a factor in any system of transportation.

The Public, Too, Was Represented

SUPPOSE a judge in a case at law, after gravely hearing each side, should call the opposing attorneys to him and proceed to decide the case not on its merits, but on the basis of the minimum which each side would be willing to accept. Suppose that this was his general practice in deciding suits. How long would such a judge hold his place?

Yet it has been freely said that many of the wage awards of the past two years have been more than all the facts, if ascertained, would warrant, and that the figures arrived at have too often been mere compromises to which the third arbitrator would agree, have been dictated by political expediency, or have been forced grants, either as one necessary step in obtaining higher fares or as a means of preventing unbearable strikes or other serious troubles.

But in the Cincinnati case, mentioned last week, if we are correctly informed, no suggestion of a compromise or a forced solution received consideration. Upon assumption that the third arbitrator largely controls the spirit of an arbitration, real credit is due Prof. Alonzo Tuttle for his attitude and action in the case. And, further, it appears that, judging from the method of his appointment, the public was also represented in this arbitration. It is to be hoped that this arbitration is but the forerunner of others on the same policy.

As to the actual figures, we have no proof that 59 cents is the correct answer, but we presume it will be sure to be so when the record of the case is studied. The fact that a rate of 75 cents or 67 cents or 52 cents is in effect in some other city has no real relation to the rate in Cincinnati. What is important is that the decision should be as nearly right as possible. It is better for every one concerned to have a figure which can be substantiated than to have one based on false conclusions, only to have readjustments to make later.

Federal Commission Report

Hearings Held Last Year by Federal Electric Railways Commission Result in Constructive Report Submitted July 28, 1920, to President Wilson—

Full Text of Report Is Given



FEDERAL ELECTRIC RAILWAYS COMMISSION

From left to right, W. D. Mahon, C. W. Beall, Philip H. Gadsden, Charles E. Elmquist (chairman), Charlton Ogburn (secretary, is standing), Edwin F. Sweet, Royal Meeker, Louis B. Wehle. George L. Baker was absent when this view was taken.

HONORABLE WOODROW WILSON,
President.

SIR: The Federal Electric Railways Commission begs leave to present the following report.

This commission was appointed by you in response to a suggestion outlining the need of such a commission in the following letter from two members of your Cabinet, the Secretary of Commerce and the Secretary of Labor:

Washington, D. C., May 15, 1919.

DEAR MR. PRESIDENT:

The electric railway problem to which your attention has been called on several occasions has recently assumed such serious national proportions as to warrant the prompt attention of the federal government. Already fifty or more urban systems, representing a considerable percentage of the total electric railway mileage of the country, are in the hands of receivers. The communities affected are among the most important—New York, Providence, Buffalo, New Orleans, Denver, St. Louis, Birmingham, Montgomery, Pittsburgh, Memphis, Ft. Wayne, Des Moines, St. Paul, Spokane, Chattanooga.

Other large systems are on the verge of insolvency, for the industry as a whole is virtually bankrupt. The continued shrinkage in the value of hundreds of millions of electric railway securities held by savings banks, national banks, life insurance companies and by the public at large threatens to embarrass the nation's financial operations. Furthermore, the withdrawal of this industry's buying power, which is said to rank third in magnitude, involves the unsettlement of collateral industries, naturally entailing labor dislocation that will affect hundreds of thousands of employees.

The return to normal conditions is being hampered and the efforts of the government to avert strained conditions in finance, labor and commerce are being less fruitful of satisfactory results than would be expected, if some solution of the electric railway problem were in view.

What the solution is may, we believe, be evolved by a thorough investigation of general franchise and operating conditions in their relation to rates, including service-at-cost plans, state and municipal taxation, local paving requirements, and internal economies that may be effected.

We therefore propose and recommend the appointment by you of a federal board or commission, whose duty it shall be to study and report upon the entire problem, in order that the State and municipal authorities and others concerned may have the benefit of full information and of any conclusions or recommendations that may be formulated. Such a study will, in our opinion, exert a helpful and constructive force in this critical period of the industry's existence, and will aid in the readjustment. If

you would make such an appointment before June 30, your contingency fund could be used to defray the expenses, which would be about $10,000.

The National Association of State Commissioners has always invited federal aid in this matter and the recent conference of governors and mayors adopted a resolution recommending federal consideration of the problem of preventing the financial disaster threatening this industry.

We propose that such a commission shall be made up of one representative of each of the following groups:

Treasury Department or War Finance Corporation, Department of Commerce, Department of Labor, National Association of State Commissioners, American Cities League of Mayors, Amalgamated Association of Street & Electric Railway Employees, American Electric Railway Association, Investment Bankers' Association of America.

We respectfully urge your authorization for such a commission, to be followed by your formal proclamation upon the selection of personnel.

Cordially yours,

(*Signed*) WILLIAM C. REDFIELD,
Secretary of Commerce.

(*Signed*) W. B. WILSON,
Secretary of Labor.

The commission appointed by you on the 31st day of May, 1919, consisted of the following members, who were to serve and have served thereon without compensation.

CHARLES E. ELMQUIST, *president and general solicitor of the National Association of Railway & Utilities Commissioners.*

EDWIN F. SWEET, *Assistant Secretary of Commerce, representing the Department of Commerce.*

PHILIP H. GADSDEN, *representing the American Electric Railway Association.*

ROYAL MEEKER, *Commissioner of Labor Statistics, Department of Labor, representing that Department.*

LOUIS B. WEHLE, *general counsel of the War Finance Corporation, representing the Treasury Department.*

CHARLES W. BEALL, *of Harris, Forbes & Company, New York, bankers, representing the Investment Bankers' Association of America.*

WILLIAM D. MAHON, *president of Amalgamated Association of Street & Electric Railway Employees of America, representing that association.*

GEORGE L. BAKER, *Mayor of Portland, Oregon, representing the American Cities' League of Mayors.*

The commission met on June 4, 1919, in Washington, D. C., and organized by electing Charles E. Elmquist as chairman and Edwin F. Sweet as vice-chairman, and subsequently appointed Charlton Ogburn as its executive secretary. At its first meeting the commission announced that it would attempt to determine the general principles which should govern the regulation, operation and service of electric railways, but that the commission was without authority to hear and determine specific local controversies, and that it would not undertake in any way to encroach upon the functions of state commissions or of municipal authorities; that the purpose of the commission was rather to investigate and study the conditions of the electric railway industry, including franchises, rates, taxation and assessments, economies of operation, public relations, regulation, etc.

The commission gathered its testimony mainly in two ways: First, by public hearings, at which ninety-five witnesses testified in person and twenty-one others sent prepared statements; second, by a series of questionnaires sent to every city in which there is a street or interurban railway, addressed to the electric railways, the mayors, chambers of commerce and the central labor unions, and also to all of the state public utility commissions.

The first public hearing was held in New York on June 19, 1919. The next hearing was held in Washington on July 15, lasting two weeks, during which time the witnesses on behalf of the electric railways presented evidence under the direction of the Committee of One Hundred of the American Electric Railway Association. The next hearing was in Washington beginning Aug. 11, and lasted one week, testimony being offered on behalf of the public, chiefly by representatives of the municipalities and all state public utility commissions. At the last hearing held in Washington beginning Sept. 29, and lasting one week, testimony was offered by further witnesses representing the public and by witnesses on behalf of labor, represented by the Amalgamated Association of Street and Electric Railway Employees of America. All of these hearings ran through day and night sessions beginning at 10 a.m and usually continuing until 10 or 11 p.m., and totaling one month.

Among the witnesses were ex-President William H. Taft, Secretary of War Newton D. Baker, leading bankers, railway managers, economists, mayors, public utility experts and state public utility commissioners.

The testimony taken embraced 6,195 pages of typewritten transcript.

Three separate questionnaires were later sent out. The first was general, dealing with all phases of the situation. The last two were special, seeking traffic figures, month by month, for the past three years; that is, as to the number of revenue passengers, amount of passenger revenue, fare charges, and any occurrences affecting traffic, such as strikes, influenza epidemic, and the like.

At the conclusion of the final public hearing, the commission engaged the services of Dr. Delos F. Wilcox to aid in analyzing the testimony gathered and to make suggestions to the commission with reference to its report. Dr. Wilcox made a very comprehensive analysis of the evidence, containing 823 pages of matter. The commission regrets that it cannot publish this analysis with the proceedings, since it presents a complete and masterful study of the whole electric railway problem. Printed with the evidence, however, is a summary of the Wilcox report, prepared by him. The answers to the questionnaires resulted in bringing to the attention of the commission a great mass of information. All the evidence, exhibits, analysis of Dr. Wilcox, and tabulated summaries of information found in the answers to the questionnaires have been considered by this commission.

The final meeting of the commission was held in Washington July 22 to 27, 1920, inclusive, for the purpose of formulating this report.

Owing to the divergent representation of its personnel, this unanimous report of the commission necessarily represents decided concessions by some of its individual members.

A complete report of the testimony will be printed, together with this report, and will be placed in the Congressional Library in Washington and other leading libraries in the country, with all regulatory commissions, and with the mayors of the leading cities of the United States.

For convenience, we wish before proceeding to our discussion to state our principal conclusions and recommendations, which are as follows:

SECTION I

Conclusions and Recommendations

I. The electric railway furnishing transportation upon rails is an essential public utility, and should have the sympathetic understanding and co-operation of the public if it is to continue to perform a useful public service.

II. The electric railway has been, and will continue to be, a public utility, subject to public control as to the extent and character of the service it renders, and as to the rates it charges for such service.

III. It is of the highest importance that both the total cost of the service and the cost to the individuals who use it shall be kept as low as possible without injustice to those who take part in producing it.

IV. The electric railway industry as it now exists is without financial credit and is not properly performing its public function.

V. This condition is the result of early financial mismanagement and economic causes, accentuated by existing high price levels of labor and materials, and of the failure of the uniform unit fare of five cents, prescribed either by statute or by local franchise ordinances or contracts to provide the necessary revenues to pay operating costs and to maintain the property upon a reasonable basis.

VI. The industry can be restored to a normal basis only by the introduction of economies in operation, improving its tracks, equipment and service, and securing a reasonable return upon the fair value of its property used in the public service when honestly and efficiently managed.

VII. The electric railways must expand to meet the growing needs of their communities; therefore, the first essential is to restore credit in order to obtain necessary new capital for the extension and improvement of service.

VIII. Restoration of credit involves a readjustment of relations which will remove public antagonism, provide public co-operation, and insure to the investor the integrity of his investment and a fair rate of return thereon.

IX. Effective public co-operation should be exercised by eliminating, in so far as it is practicable, special assessments for sprinkling, paving, and for the construction and maintenance of bridges which are used by the public for highway purposes.

X. Extensions into new territory resulting in special benefits to the property in that vicinity should be paid for by assessments on such property in proportion to the benefits received, and that the amount of such assessments should not be added to the physical value of the corporate property.

XI. The great increase in the use of private automobiles, the jitney and motor buses, has introduced a serious, although not a fatal, competition to the electric railway. These forms of public motor conveyance when operated as public carriers should properly be subject to equivalent regulatory provisions.

XII. The full co-operation of labor is essential to the highest prosperity and the usefulness of the industry. The employees engaged in this occupation should have a living wage and humane hours of labor and working conditions. They should have the right to deal collectively with their employers, through committees or representatives of their own selection. All labor disputes should be settled voluntarily or by arbitration, and the award of such a board should be final and binding upon both parties. It is intolerable that the transportation service of a city should be subject to occasional paralysis, whether by strikes or by lockouts.

XIII. A private industry should not be subsidized by public funds, unless it is imperatively necessary for the preservation of an essential service, and then only as an emergency measure.

XIV. Unless the usefulness of the electric railways is to be sacrificed, public control must be flexible enough to enable them to secure sufficient revenues to pay the entire cost of the service rendered, including the necessary cost of both capital and labor.

XV. There can be no satisfactory solution of the electric railway problem which does not include the fair valuation of the property employed in the public service, and, where that is done, the companies should voluntarily reduce any excessive capitalization to the basis of such value.

XVI. There is no insuperable objection to a large, wide-awake city having exclusive jurisdiction over the rates and services of public utilities.

XVII. The necessity for scientific and successful regulation of systems, whether large or small, and especially those which operate through several cities and villages and in rural territory, leads to the conclusion that local regulation should generally be subject to the superior authority of the state, whether as a matter of original jurisdiction or through the medium of appeal.

XVIII. Cost-of-service contracts are in the experimental stage, but, where tried, they seem to have secured a fair return upon capital, established credit, and effected reasonably satisfactory public service. Such contracts may safely be entered into where the public right eventually to acquire the property is safeguarded.

XIX. The right of the public to own and operate public utilities should be recognized, and legal obstacles in the way of its exercise should be removed.

XX. While eventually it might become expedient for the public to own and operate electric railways, there is nothing in the experience thus far obtained in this country which will justify the assertion that it will result in better or cheaper service than privately operated utilities could afford if properly regulated.

XXI. Public ownership and operation of local transportation systems, whether or not it be considered ultimately desirable, is now, because of constitutional and statutory prohibitions, financial and legal obstacles, the present degree of responsibility of our local governments, and the state of public opinion, practicable in so few instances, that private ownership and operation must as a general rule be continued for an extended period.

XXII. If the reforms incident to public regulation which we suggest in this report should not result in making private ownership satisfactory to the public, such reforms should at least enable public ownership to be established upon a just and equitable basis.

SECTION II

The Street Railway Is an Essential Industry

THE electric railway industry at present is a factor of essential importance in the urban life and, to a scarcely less extent, in interurban relations of the country.

The experience of seventy-five years, the unanimous opinion of expert witnesses and of those who are students of transportation problems, and the assumption of the necessity for tracks by inventors working to improve the methods of street transportation, alike demonstrate the fundamental and permanently essential nature of the railway and, to the present time, of the electric railway—as the most nearly adequate, reliable and satisfactory system available for transporting the maximum number of people through the streets of our cities with the least interference with the use of these streets for other purposes of public ways.

The Bureau of Census reports for the year 1917 show the net capitalization as of December 31, 1917, to be $4,889,962,096, which makes this industry one-fourth as important as the steam railroads of the country in point of capitalization. The total mileage in 1917 was 44,835. The net capitalization per mile of track is $109,065. The total revenues for 1917 from railway operations were approximately $650,000,000.

These statistics do not include the electrified portions of steam railroads engaged in suburban service. Approximately 40 per cent of the mileage is suburban in character.

The number of people with whom the electric railways come into daily contact is shown by the fact that in the year 1917 they carried a total of 11,304,660,462 revenue passengers and 3,202,254,111 transfer and free passengers, as compared with a total of 1,066,638,474 revenue passengers carried by the steam roads.

In spite of the immense development of the automobile industry the demand for electric railway transportation has increased at a rapid rate. It is estimated that on December 31, 1917 there were 4,643,481 passenger automobiles and that two-thirds of the development of that industry was subsequent to 1912, but the number of revenue passengers carried by the electric railways was approximately 1,800,000,000 more in 1917 than in 1912. During the year ended June 30, 1919, the total number of revenue passengers carried by the local transportation lines of New York City was 2,079,942,604 as compared with 1,402,417,642 carried during the year ended June 30, 1909, an increase of more than 48 per cent in ten years. On the basis of the estimated population served the number of revenue rides per capita in New York City in 1909 was 304 and in 1919, 370, an increase of nearly 25 per cent in the riding habit.

In this connection Henry G. Bradlee, president of the Stone & Webster Corporation, stated in a letter dated October 1, 1919, as follows:

It would appear that something has been and is still stimulating the street railway business; possibly the automobiles themselves have helped in this direction. People may be acquiring to a greater extent than ever before the riding habit and may be more and more inclined to move about and spend less time in their own home or with their own neighbors. The moving picture is probably also a factor in the situation, but whatever may be the cause, the facts seem pretty clear that the demand for transportation service is still growing apace. This fact, I think, is generally not understood; in fact, I am free to confess that we, ourselves, were surprised to see the extent of the increased demand for service.

In 1917 the number of employees were 294,826 and it is estimated that the total number of people who were directly and conveniently accessible to electric railway service is about 50,000,000 at the present time. The electric railways have overflowed municipal boundaries and now include a network of interurban lines in many portions of the country, but the fact still remains that the industry is primarily a street railway with its principal function the transportation of passengers within the limits of municipalities.

While the electric railway industry is essentially local it has certain national characteristics. Its difficulties cannot be regarded simply as the isolated problem of a local system repeated hundreds of times all over the country in varied forms and degrees, each problem being independent of all of the others.

On the contrary, although a local traction system may be separated by hundreds of miles from its nearest neighbor, it is in other ways inseparably connected with all of the others. As a purchaser in the equipment markets of other states it competes with other companies.

Its demands for labor and its scales of wages are necessarily felt at once by traction systems everywhere. In procuring its capital its officers have been generally compelled to market its securities to a large extent in other states, among investors who are particularly interested in such classes of investment. The close industrial and financial interdependence of the hundreds of physically unrelated local traction systems, the millions of dollars of capital placed by thousands of investors in plants which manufacture electric traction equipment and the five millions of dollars of electric traction bonds and stocks to be found scattered all over the country in banks, insurance company reserves and in private investment, translate the many local problems into a national problem.

SECTION III

Financial Condition of the Electric Railway Industry

THE investigation demonstrates that the financial condition of the electric railway industry is acute, and that, to a very great extent, it is not properly performing its public functions.

The record in this case shows that on May 31, 1919, there were sixty-two companies, having a mileage of 5,912, in receivership, that sixty companies had dismantled and junked altogether 534 miles of railway, and that thirty-eight companies together had abandoned 257 miles of track. Since that date and up to July 1, 1920, there have been fifty-six additional companies, having a mileage of 1,906, which have been thrown into receivership.

The capitalization of the industry according to the 1917 census report is represented by $3,058,377,167 in bonds and $2,473,846,651 of stock. For the year 1917 the net income of operating companies was $56,450,930, representing an average rate of return of 2.81 per cent upon the capital stock. In 1918, the evidence shows the net income was reduced to $20,183,413, which represents a return of only 1 per cent. As a whole, there has been some improvement in the industry since the commencement of these hearings, due to the fact that there has been an increase in the car-riding habit since demobilization, and in a great many instances the fare has been increased beyond 5 cents. In spite of this slight improvement, however, the condition of the industry at the present time is serious. A great many companies are unable properly to maintain their track and equipment and to perform efficient public service, to

secure funds with which to purchase new equipment, to build necessary improvements and extensions, or to refund maturing obligations.

A large number of factors have contributed to the present plight of the electric railway industry. These may be mentioned:

(a) They were not conservatively financed in their early years, and have not since made good their overcapitalization, except to a limited extent, otherwise than through the process of bankruptcy and reorganization. In the early days the promotors of electric railway properties believed that long term franchises with a 5-cent fare would be permanently profitable. Large sums of money were required to develop the business. In many cases the promotors issued bonus stock to represent their hopes and expectations. This bonus stock did not represent money, service or property, and added nothing to the value of the plant. As a result of this practice, there are many cases where the existing capitalization exceeds the investment in the plant or the value thereof.

(b) Neglect to amortize this excess capitalization.

(c) Failure to amortize the normal accrued depreciation.

(d) Payment of unearned dividends and neglect of ordinary maintenance.

(e) Overbuilding into unprofitable territory or to promote real estate enterprises, involved sometimes with political improprieties.

(f) A uniform 5-cent fare, which established a constant rate to apply during variable cost periods. This contract fare has been a source of irritation, resulting in litigation. During normal times many communities sought to have the fare reduced below the contract price.

The railway companies insisted upon adhering to the contract, and they were sustained by the courts. During the recent high-cost period many companies have applied for an increase in fare to enable them to meet operating expenses and fixed charges. In many cases communities undertook to prevent the increase beyond the contract rate. Under the decisions of the Supreme Court of the United States and of the highest courts of a number of states, it is now established that a franchise provision naming a certain rate of fare creates no right of any car rider in such fare which cannot be properly changed by appropriate legislation and substituted by a higher charge.

As indicative of the fact that the 5-cent fare has not been adequate during the war period, we need only to call attention to the fact that on July 1, 1920, increased fares have been allowed in over 500 selected cities. 10-cent fares have been allowed in sixty-nine; 9-cent fares in two cities; 8-cent in 30 cities; 7-cent with 1-cent charge for transfer, in 26 cities; 7-cent zones in 6 cities; 7-cent in 145 cities; 6-cent zones with 2-cent transfer charge, in 10 cities; 6-cent for two zones with 2-cent per zone thereafter, in 13 cities; 6 cents for each two zones in 4 cities; 6 cents cash fare in some cases in 149 cities; 5 cent zones and elimination of reduced rate tickets in 50 cities.

Boston has a 10-cent fare. Chicago, Washington, Cincinnati, Kansas City, Youngstown and other large cities are on an 8 cent basis.

It would seem that so long as the railways depend upon earning power, and earning power depends upon passenger revenue, the fixed uniform fare is a broken reed for the industry or for the community to lean upon. Perhaps the general sentiment of the electric railways is best expressed by the evidence before this commission of Gen. Guy E. Tripp, as follows:

We were all living in a fool's paradise in the street railway business when we suddenly woke up—when the war woke us up—to find that no business which cannot increase its revenues under any conditions can live or is sound.

Conversely, it may be said that no community should bind itself by contract or otherwise to continue after normal conditions have been restored a rate which might be found reasonable during this abnormal period.

(g) Limited franchises which impair credit and toward the expiration of the franchise result in neglect of the maintenance of the property.

(h) Special taxation and franchise obligations, having particular reference to street paving, street sprinkling, construction and maintenance of bridges used by the general public, general taxation, and so forth.

The American Electric Railway Association introduced a chart which showed that the total amount of taxes levied against the properties in 1917 amounting to $45,756,695, of which taxes on real and personal property was $21,804,619, and on earnings, capital and other taxes $23,952,076, representing 10.11 per cent of the operating expenses. In 1902 the ratio of taxes to operating expenses was 9.19 per cent. It is thus seen that there is only a small increase in the ratio of expense for this item since last year.

For the period from 1913 to 1918 the expenditures for all taxes including paving and other imports, has ranged from $60,000,000 to $65,000,000, corresponding to ten per cent of the operating revenues. The ratio varies very materially among the different plants.

The evidence on behalf of the companies therefore shows that on the basis of the 5-cent fare, the taxes represent about one-half of a cent in the nickel which the car rider has been paying, and that they thus contribute materially to the necessity for fare increases.

The argument has been made with considerable force that the car rider should be required to pay for service alone; that he should not, through his carfare, be required to pay for supporting the city's schools, its alms houses and other city institutions. It is contended that the company should be required to pay in taxes to the city only such an amount as would reimburse the city for its actual cost due to the presence of the street railway; and that such a plan of taxation alone would be consistent with the idea that the carfare should be based upon the real cost of rendering the actual service of transportation.

Although there is much force in this idea, and it should be borne in mind by all who are interested in street railway problems, we do not think the time is ripe for recommending its general adoption. The heavy taxation to which the companies are now subject came into being during the period of their prosperity and at a time when they were still essentially private concerns, relatively free from regulation. It was natural that their properties should be taxed in no less degree than the properties of other private corporations.

When a company comes to subject itself to such a comprehensive regulation as renders its property in effect a public instrumentality then tax exemption begins to be in order. This course has indeed been followed in Cleveland, where as an incident to the passing of the properties under the Tayler plan of municipal regulation they came to be exempted in large measure from taxation. To the extent that it may become possible in any community under similar conditions to exempt street railway property from taxation, the rider's carfare will come more nearly to represent the actual cost of rendering the service of transportation —in itself a desirable result. But it would seem that the status of the company as a public agency should be well assured before such exemption should be attempted.

(i) AUTOMOBILE AND JITNEY COMPETITION—For several years prior to the war, and to an increasing extent throughout the war period and up to the present time, the automobile has proven to be a serious competitor of the electric railways rendering local transportation service.

Jitneys and automobile buses operating as common carriers have been able in some cases, through the absence of sufficient public regulation, to engage in unfair and destructive competition with the electric railways for the most profitable part of urban passenger traffic. Strong as this competition has been, however, the electric railway industry as a whole has shown a very substantial increase in the riding habit. The operation of jitney buses as common carriers is much more restricted than the operation of private automobiles, but the jitneys have had a definite and intensive effect upon the street railway situation in particular communities, for the reason that they have

engaged in direct and in some respects destructive competition with the street cars as public carriers. The experience of numerous communities, even before the extraordinary conditions growing out of the war, made it clear that unrestricted jitney operation though more or less temporary and precarious in character, threatens the service, credit and solvency of the street railways.

(j) HOLDING COMPANIES AND BANKER CONTROL — About 75 per cent of the public utilities of the country are held, in whole or in part, by so-called "holding companies," which are responsible for their operation. This financing is done in large part through the securities of the parent company, which securities are supported by the securities of the various operating companies. This frequently gives an element of strength to the securities of the parent company which a single localized operating company could not in all cases present. If it were not for the supporting strength of these parent companies, many of the individual operating companies would have gone under before Jan. 1, 1918.

Through these holding companies the electric railways threaten to become a banker-controlled industry. Those who have the ultimate say in matters of street railway policy from the point of view of investors have been dependent for their profits and their power upon the volume of securities outstanding and the frequency with which these securities have been exchanged or refunded. Holding companies in many instances have been responsible for overcapitalization, and have insisted upon drawing from the underlying companies every possible cent that could be secured in order to make a showing on these inflated securities. Hon. Joseph B. Eastman, at present a member of the Interstate Commerce Commission, discussed the question as follows:

In the third place a factor of weakness I think was the control of the companies in many instances by holding companies organized in the form of voluntary associations, or to use a more technical term, express trusts. Although the stock and bonds of the street railway companies themselves were issued under public supervision, these voluntary associations which corralled all their stock were subject to no regulation whatever and issued shares upon an inflated basis, and that had the result of accentuating the desire to draw every possible drop of income out of the underlying companies that could be secured in order to support earnings upon the inflated shares of these voluntary associations.

Through this system of financing and management, the utilities have been largely controlled by persons living distant from the community affected by a particular electric railway, whose prime consideration has been to secure a return upon the property. This "absentee" management and control has not been successful in bringing about the proper spirit of co-operation between the local managers, employees, and the public. Since the electric railway companies come into immediate daily contact with large numbers of people, it is of the utmost importance that the industry should gain and hold the respect, confidence and good-will of its patrons. If the local public should invest its money in the stocks and bonds of its local utilities there would be an improvement in the relations now existing between the corporation and the public.

(k) USE OF REGULATORY POWER TO COMPEL MORE AND BETTER SERVICE— Through the exercise of this power the companies have been required in many instances to improve their standards of service and equipment; to equip cars with vestibules for the protection of the motormen and to give better heating, lighting and ventilation for the comfort and convenience of the passengers. They have also been obliged to install safety devices and make stops at frequent intervals. The exercise of the regulatory power of states and municipalities has undoubtedly added to the cost of the service.

(l) UNDERLYING COMPANIES AND LEASED LINES — Consolidations have been brought about through the unification of a number of separate corporations which owned and maintained lines of track within the same city. In many cases consolidations were made upon the condition that these companies should be guaranteed a certain rate of return or fixed sum, which represented a high percentage yield upon the investment. The returns thus secured have been a frequent source of irritation, induced by a feeling that these underlying companies are being paid more than a reasonable return upon the value of their property. Your commission believes that excessive payments to the underlying company by the operating company have greatly diminished the net operating revenue and that there can be no satisfactory solution of the street railway problem in such communities until the system has been valued as a whole and the accounts so kept that the public may know that the rate of fare paid yields no more than a fair return upon the value of such property.

(m) INCREASING DEMANDS OF LABOR—The wages of street railway labor prior to the war were generally insufficient from the viewpoint of the living wage, and the increases in wages that have taken place since the beginning of the war period have not on the average been as great as the increase in the cost of living.

At the time of our entry into the war the average wages of motormen and conductors for companies of 100 miles and over were approximately 31.5 cents per hour. Since the war there has been a rapid increase in the wages of employees. The National War Labor Board by its awards in the year 1918 established the normal wages for this class of service in different cities varying from 38 cents to 48 cents per hour, increasing wages 23½ per cent. The awards of the board mark the beginning of the rapidly increasing wages in this class of employment. An exhibit filed by the Amalgamated Association of Street & Electric Railway Employees of America shows the wages for conductors in the principal cities of the United States and Canada as of Jan. 1, 1920. For convenience the exhibit is published as an exhibit attached to this report.*

Since that date new contracts have been agreed to which substantially increase the wages in a number of cities.

(n) THE WAR AND THE DOLLAR— The conditions which have been here enumerated tended to break down the credit and stability of the electric railway industry. The increases in prices of labor and materials entering into the construction, maintenance and operation of electric railways during the war period have corresponded with the increases in the prices of general commodities and in the wages of labor in all industries. Operating costs became so high that in many cases the revenues were not sufficient to pay even the current expenses of operation. Material and equipment prices reached abnormal heights. The increases over 1915 in railway motors and car equipment show 87 per cent; locomotives, 87 per cent; rotary converters, 75 per cent; transformers, 70 per cent; switchboards, 100 per cent; motor generator sets, 95 per cent; turbines, 100 per cent; pig iron, 106 per cent; steel plates, 141 per cent; copper, 58 per cent; steel castings, 220 per cent; coke, 33 per cent; coal, approximately 100 per cent; asbestos material (which is largely used), 560 per cent; other insulating materials, 125 per cent; magnetic sheet steel, 280 per cent; labor, from 85 per cent to 90 per cent.

(o) COST OF NEW MONEY—The destruction of capital incident to the world war and the unprecedented demand of the government and industries for money resulted in largely increasing the interest rate for loans. More attractive loans are now absorbing money available for investment, leaving the electric railways where, even with credit restored, they would have to compete in the money market with prosperous and unregulated enterprises.

These factors, and more particularly the increase in wages, fuel, material and supplies during and since the war period have brought the electric railway industry to the point where in many instances it may be forced to abandon public service, and in most cases to a point where it will be unable to secure new capital to enable it to refund maturing obligations, secure new equipment, and to make necessary extensions and improvements, unless some solution of the situation can be found.

*See page 411

SECTION IV

Emergency Relief

THE evidence in this case shows that the state regulating commissions, and in a large number of cases the local tribunals, have recognized that it has been necessary to grant emergency relief to secure to the communities the service of the electric railways.

With commendable initiative and oftentimes against a hostile public sentiment the regulating officers have granted temporary increases in the fares without undertaking to determine the value of the plants or without making a long and exhaustive investigation.

Very little if any criticism was made to us against state regulating commissions for their treatment of these utilities during the war period. The most serious difficulties were met with in communities where the charge was fixed by franchises and the state authorities were without jurisdiction to regulate fares.

During a war or other abnormal periods, it would seem to be the duty of the state and municipal officers to deal promptly with petitions for increased fares, and to afford such relief as will enable the street railway to serve the public and maintain its track and equipment in proper operating condition.

The public always pays for a run-down plant, either through inferior service or higher charges. The first essential is service to the public. Due recognition of this fact will secure to the investor a safe return upon his investment and to the public uninterrupted operation.

SECTION V

Credit and Co-operation Are the Co-ordinate Needs of the Electric Railways

IT IS clear from this record that the two serious needs in the electric railway situation today are its need of credit and its need of co-operation between the public and the utility.

Credit will enable the electric railways to rehabilitate themselves, to adjust their capital accounts and to meet the prices of normal replacements which are now upon higher price levels. The co-operation of labor will enable them to render continuous and popular service, to effect operating economies, and to get into their treasuries the full amount of revenue collected from the riding public. First-class credit and the full co-operation of their employees, if properly utilized in rendering adequate public service, would give the electric railways a well-nigh impregnable position in their relations to the public and tend to disarm and overcome the prevailing antagonism against them. With capital and labor performing their respective parts freely and well, restrictive regulation would be unpopular, and the demand for substitution of public ownership and operation for private management would shrink into relative insignificance.

The test of private ownership and management lies in the solution of these two problems of credit and co-operation. These problems must be solved, and if no solution of them is practicable under present ownership and control, then the only course open is the complete transformation of the electric railway industry into a governmental business. Each member of this commission believes that credit can be secured and private operation maintained under the proper public supervision.

Unless the confidence of the investor in the securities of companies furnishing this essential public service be restored, the public itself must in some way assume the burden of supplying the funds that are necessary for their continuance.

To a degree unknown to private business enterprises, which to a certain extent are able to finance capital expenditures from earnings, the electric railways are dependent upon new investment—new capital—for the extension, improvement and betterment of the service which they perform. Communities need and are constantly demanding additional local transportation facilities. They require large sums of money, which can come only from those with savings to invest. When the flow of new capital ceases, when the confidence of the investor in the ability of the enterprise to safeguard the integrity of the investment and to insure a fair return thereon ceases, new capital is unobtainable and the utility can no longer serve the purpose for which it was created.

This condition is now present. Lack of confidence in electric railway investment exists today to a degree which has caused a partial paralysis, is working havoc with the finance of the companies, and is depriving the public of the service to an alarming extent.

For rehabilitation and improvements and extensions which are vitally needed to meet the requirements of every growing community, new capital at once and in large amounts is imperatively required, and until the force of circumstances convinces those with capital at their disposal that investment in electric railway securities affords safety and a fair return, it cannot be obtained.

So far as the requirements in normal times are concerned, certain characteristics of the electric railways and certain conditions under which they operate tend to make their credit almost unlimited. In the first place, they have enjoyed a monopoly of the most convenient form of local transportation during a period of rapid industrial development and of rapid increase in urban population. They have a continuous and immediate market for their "goods." They sell transportation as it is produced. While electric railway traffic fluctuates somewhat from year to year according to the number of passengers and the prosperity that prevails, and fluctuates somewhat from season to season, from week to week, and from day to day, these fluctuations are relatively unimportant. The business of transportation goes on every day in the year. Under normal conditions the credit of the electric railway business is its relatively small need for "fluid" or working capital. In this respect it occupies a position more independent than that of any other utility or any other ordinary private industry. It does a cash business. Almost 100 per cent of its revenues are collected in advance, through the sale of tickets or at the time the service is rendered, from the collection of fares in the cars. Money flows into its coffers day by day in a relatively even stream. Before it pays the wages of its employees, the salaries of its officers, the claims resulting from injuries and damages, the rentals for the use of property, the interest and dividends on its investment, or its taxes, it has already collected from its patrons in cash full compensation for the service rendered. It does not send out bills.

The increase in revenues of the electric railways is a product of three

lines of expansion. These are the increase in urban population, the increase in the riding habit, and the increase in the rate of fare. The gross operating revenues of the electric railways grew from $247,000,000 in 1902 into $650,000,000 in 1917, an increase of 163 per cent.

For a number of years, particularly during the first decade of the century, there was a strong tendency toward fare reductions in many urban communities, but the evidence shows that for the country at large the total amount of electric railway operating revenues increased by a much greater percentage than the number of revenue passengers during the fifteen years ended with 1917. Since the latter date there has been a strong upward tendency in street railway fares. Statistics covering 75 per cent of the electric railway traffic of the country indicate an increase of nearly 14 per cent in the average fare paid from 1917 to 1919, and an increase of about 22 per cent in passenger earnings during this two-year period.

Without a doubt the enjoyment by the electric railway industry of a steady inflow of revenue of rapidly increasing volume assured by the most fundamental conditions of modern life and the strongly developed habits of the people is extremely favorable to credit. In what other industry could investment be made with greater assurance of security and continued earning power? The tracks for the most part are in the public streets where everybody can see them. The operation of the cars is most conspicuous. It would be hard to find another industry where the investment is completely visible to all and so freely observed by the entire population. If publicity of operation is a guaranty against the waste and disappearance of capital, then the position of the electric railway, where everybody can observe it every day, is surely conducive to the development and retention of credit. From this viewpoint how different is a street railway investment from an investment in mining stock or in the fruit lands of the far West, or even in manufacturing enterprises in one's home city? The capital stock of electric railways does not require to be refunded, and under sound financial and regulating policies the proportion of stocks to bonds outstanding would undoubtedly be much greater than is shown to have been the case. Under such conditions refunding difficulties would be almost negligible.

The record is not clear as to the amount of new money which may be required year by year, but a very conservative estimate places the figures at between $175,000,000 and $200,000,000 per annum, to be used in replacements, refunding obligations, extensions, and improvements.

For the purpose of restoring credit, it seems to be the general impression of all witnesses that the first necessity is for the industry to put into effect such economies of operation as will enable it to give good service at the lowest cost. Generally speaking, this can be done by the elimination of deadheads and other free service, the abandonment of non-profitable lines, and, where practicable, the substitution of one-man cars for heavier equipment, the modification of special taxes or provisions for paving, snow removal, street cleaning, tools, contributions toward the cost of public highways, bridges, etc., reduction of such rentals and power rates as may on investigation prove excessive, the co-operation with the public in developing faster schedules and installing skip-stops at convenient places, rerouting of cars, the use of trailer cars, keeping street-car tracks clear of traffic and other congestion due to parking of motor cars on curbs, and the regulation of vehicular traffic. Much can also be done toward reducing the cost of operation by developing the proper spirit of co-operation with employees. All of the matters herein suggested properly come under the head of good management and regulation, and in some cases would entail legislation, but in our judgment they do not wholly solve the street car problem or invite needed capital into the industry.

During the past two years efforts have been made to meet the difficulty by increasing fares. In many cases this has helped to tide them over a difficult period, but it has not stimulated the confidence of the investor in the integrity of the industry. New capital is not flowing in that direction.

An effort has also been made in a number of communities to increase the short-haul riding habit as well as the revenues by the introduction of the zone system for fares. This system has proven generally successful in some of the European countries but it has met with varying success in the United States.

Fundamentally the theory of the zone system is logical. It is that a passenger pays for what he gets. Under the present flat fare charge the short-haul rider is paying for a service given to the long-haul rider.

The original failure of the electric railways to vary their rates of fare for transportation service based upon the length of the ride, as services in all other lines of business are sold, is, in our judgment, one of the contributing factors to their present financial condition. The electric railway industry is the only public utility which as an industry has consistently adhered to a flat fare basis. Steam and suburban roads charge on a distance basis. Gas, power, electric and water power companies generally make their rates upon a measured basis, subject to a minimum charge per month, and the telephone companies grade all toll messages on a mileage basis, while observing in most cases a flat rate per month for local service. Whether or not, under present conditions, it would be to the interest of a community to introduce a zone system of fares, instead of the present flat fare system, is a question which we think should be decided by the community itself, having reference to the social problems involved.

Labor on Street Railways

THE labor policies of the electric street railways will in the future be of great importance as an element in the restoration and the permanent maintenance of their credit. The full co-operation of labor is essential to the highest prosperity and usefulness of the industry. This is particularly true because in the case of the street railways the employees who immediately handle the service come into direct contact with the people who consume that service.

The evidence before this commission shows that in the past the suspensions of service due either to strikes or lockouts have been costly to both the employees and to the operating company, but the loss occasioned to those two groups has been secondary to the damage wrought to the public interest. The conditions which recurrently bring about such interruptions of service should be treated at their roots. The employees engaged in this occupation should have a living wage and humane hours of labor and working conditions. They should have the right to deal collectively with their employers through committees or representatives of their own selection. In all contracts and working agreements made between them and the employing companies, there should be arbitration provisions under which all labor disputes which cannot be voluntarily settled shall be submitted to boards of arbitration composed of disinterested persons. The award of such a board of arbitration should be final and binding upon both parties to the controversy; for it is intolerable that the transportation service of a city should be subject to occasional paralysis, whether by strikes or by lockouts. It would seem that public authorities could well interest themselves in the formulation of such plans and rules for the arbitration of labor disputes under these contracts as will secure justice to both parties and as will assure continuity of service in so far as that may be possible of achievement.

But the full co-operation of labor in the street railway industry will not have been brought about alone by the recognition of the right of collective bargaining which we have just been urging. Such recognition is but a foundation for full co-operation. The actual work of insuring it must come from the employees themselves to whom the right of collective bargaining is thus given. For that right carries with it a duty.

It would seem to be the duty of the organization which bargains for the individual worker to interest itself actively and unremittingly in his delivering to the company his best strength and intelligence.

This commission thinks that where the street railway worker has the right

of collective bargaining, the public has a right to expect that the organization or association representing him will not only procure his wage but will also continuously stimulate his whole-hearted constructive co-operation with the company and his effective service to the public.

Valuation

IT IS the law that utilities are entitled to a fair return upon the fair value of their property used in public service at the time of the inquiry. The methods for finding fair value are in dispute. No permanent solution of the electric railway question can be found in the absence of a finding of value for rate-making purposes. This applies to commission form of regulation, cost-of-service contracts, or public ownership and operation.

The public should know what it is paying for, and this question cannot be settled without knowing what the property is worth.

Although some evidence was introduced before this commission on the subject of valuation, the commission discouraged the introduction of testimony upon this question, mainly because such testimony, no matter over how many weeks or months it might have extended, would have been but a fragmentary duplication of material already available in the official records of the Interstate Commerce Commission.

Pursuant to an amendment of the act to regulate commerce, approved March 1, 1913, which amendment is known as the "valuation act," the Interstate Commerce Commission has during the past seven years been engaged in valuing the steam railroads, telegraph and long-distance telephone companies in the United States. In connection with this work it has carried on a most extensive investigation into the subject of valuation for rate-making purposes, in the course of which investigation the carriers have been represented by a conference committee of fifty, assisted by able lawyers, accountants and engineers, while the public has been represented by the State Public Utility Commissioners, their counsel, and by the general counsel of the Interstate Commerce Commission. Every theory and principle of valuation has been fully and ably discussed, argued and briefed.

On July 31, 1918, the Interstate Commerce Commission submitted its report in Valuation Docket 2, Texas Midland Railway. This report contains a full discussion of the different theories of valuation considered, the method employed by the commission in assembling all the essential data, and discussion of the requirements of the Valuation Act and the findings of the commission upon most of the disputed questions. Subsequent decisions were made in the case of the Winston-Salem Southbound, Alabama, Birmingham & Atlantic and Kansas City Southern Railroads. We are informed that decisions affecting many of the other railroads will be made during the present year.

The first requirement of the valuation act is for finding of original cost. The commission is reporting original cost as fully as it possibly can be obtained from the best available evidence in each particular case. In its valuation proceedings it has been earnestly contended that the cost of reproduction new as of the date of inquiry should be taken to be the value of the property. Others have contended with equal earnestness that the value of the property should be limited to the original cost, as this item represents the money which has been actually invested by the stockholders and bondholders in the property.

The rapid increase in the cost of labor, supplies and material during and subsequent to the war period seems to have served as a peculiarly vivid indication that the original cost is a primary factor in finding value for rate-making purposes.

In our opinion, the decisions of the Interstate Commerce Commission, based upon long experience and investigation, will in large measure settle the standards of valuation. For this reason we suggest that municipalities and states which may be engaged, by arbitration or otherwise, in fixing the values of electric railways, should familiarize themselves with the practice, experience and decisions of the Interstate Commerce Commission in these valuation cases.

The valuation, when once fixed as the basis for the financial return of the company, should logically come to affect the amount of capitalization. No matter what may be the plan of operation or of public regulation under which the company is working, if its financial credit is to be strengthened through just ahd stable arrangements with a friendly public, it should, in the judgment of this commission, voluntarily reduce any excessive capitalization to conform to such valuation as may have been determined upon.

Protection and Preservation of Records

WE WOULD particularly urge public officials and officers of the electric railways to co-operate seriously in the protection and preservation of all corporate and financial and cost records.

Service-at-cost plans have been recently rejected by popular vote, largely on the issue of valuation, in Chicago, Denver and Minneapolis. The public, justly or unjustly, has become so suspicious of the electric railway companies that it may be expected to reject any service-at-cost or public ownership question submitted to popular vote, no matter how fairly the plan may be formulated, if they are not thoroughly convinced that the capital item has been fairly and honestly arrived at.

The failure of a railway company to preserve its records may in the end hurt its stockholders more than it may the public.

Automobile, Jitney and Motor Bus

THE automobile and jitney bus are facts. Jitney competition began about 1912, and was at first entirely unregulated. Even today in some places it continues without regulation of any kind, and in many places with only partial and inefficient regulation. In no instance, so far as this record shows, has this so-called "jitney" carriage of passengers been subjected to obligations as to the payment of taxes, maintenance of highways, character and extent of service, and financial responsibility for accidents, under which the electric railway business is being conducted. The portion of the street paved and maintained by the electric railway, and in winter cleared of snow at its own expense, is taken advantage of by the jitney competitor without compensation either to the company or to the municipality, and often to the serious injury of the street railway by interfering with the prompt and regular movements of its cars. The jitneys prefer to confine themselves almost exclusively to the short-haul traffic. It appears that in the city of Bridgeport the jitneys carry about 50 per cent of the passengers riding within 1¼ miles of the center of the city; almost 69 per cent of the passengers riding between 1¼ and 2 miles from the center; a fraction less than 45 per cent of those riding between 2 and 2¾ miles from the center, and none riding more than 2¾ miles from the center of the city.

The question is—from the point of view of the street railway service—what, if anything, is to be done about them? The public, through its governmental agencies, would not concern itself with the effects of this competition if it were not that local transportation is recognized to be an essential public service. So far as private automobiles are concerned, although they undoubtedly have their effect upon the extent to which people make use of the street cars, they are even now less important that human legs as a competitor of the electric railways, and it is not deemed to be consonant with the theory of American institutions and government that the free movement of private citizens by their own means of locomotion should be restricted in order to compel them to make use of public vehicles, whether the latter be operated by private agencies or directly by the government. All that could properly be done in this direction would be to compel the private vehicles using the public highways to pay license fees or taxes proportionate to the burdens they place upon the highways as compared with the burdens placed upon the highways by the street cars.

While there is some diversity of opinion as to the permanency of the electric railway industry in view of the improvements which are being made

in the use of gasoline and electric power machines, the opinion appears to be nearly unanimous that the electric railway operating on tracks is the most efficient means of furnishing local transportation service in the urban centers. The future of the gasoline public conveyance in urban transportation is entirely unreckonable. Great strides have been made and greater strides will doubtless yet be made in its use. Local public authority would indeed be exercising a dangerous power in unduly restricting the use of new inventions for public transportation at a time when in nearly every large city the physical task, even for an electric railway well equipped, of carrying the public in decent comfort, is becoming so formidable. If jitneys and automobile buses acting as common carriers were subject to regulation by state commissions and were required to procure a certificate of public convenience and necessity before establishing a route or undertaking to render public service, the motor vehicle would be prevented from entering into active competition with street car service unless the latter is shown to be wholly inadequate.

That street railway service and jitney service cannot permanently exist and pay their own way in competition with each other under any ordinary urban conditions seems to be well established by experience and by the conditions inherent in local transportation service, but the belief is general that the motor bus may properly be used to supplement the service rendered by the street cars. The motor bus may be used to render a sort of supplementary service, such as the service now rendered on Fifth Avenue and certain other high-grade residential streets in New York City by the Fifth Avenue Coach Company, or the buses may be operated on other independent routes merely as feeders to the street railway system to take care of traffic in partially developed territory in advance of the time when street railway tracks can be laid with reasonable assurance that the investment will be self-sustaining.

Undoubtedly the whole matter of the control or abolishment of jitney competition may be summed up in a few words. All transportation service is for the public. Jitneys and automobile buses cannot be repressed merely for the sake of compelling people to ride on the street cars, particularly if the car fares are higher than the jitney fares and the car service less convenient than the jitney service. However, it is clearly in the public interest that all common carriers engaged in local transportation service should be required to render adequate and safe service, and that local transportation facilities should be developed in the most economical and effective way from the point of view of the community. Unnecessary and destructive competition ought not to be permitted, and the community at large should conserve the established facility that still is and promises to continue for an indefinite period the principal means of local transportation. The problem in a considerable measure is a local one, but in every case it should be solved with intelligent regard to the permanent interests and obligations of the community. If the street railways are to be allowed the benefits of even a qualified monopoly, they should be required to fulfill their obligations. They must render service that is adequate and convenient at rates that are attractive. The community can afford to go a long way to preserve street railway service, and the efficient regulation of jitney and motor bus competition will aid considerably in restoring the confidence of investors in the future of the electric railway industry and in increasing their gross and net revenues.

Depreciation

THE electric railways should adopt the policy of setting aside a depreciation fund with which to take care of replacements and thus preserve the integrity of their investment. It would have a very wholesome effect upon credit. Such has not been the practice in the past. Deferred maintenance has accumulated to an alarming extent during the war period.

Generally speaking, regulating commissions have the power to prescribe methods of accounting and to establish the amount of the depreciation fund. This practice should be observed, and its adoption will improve the situation of the industry and be greatly in the interest of the public welfare.

Extensions Should Be Paid for by Assessments on Outlying Property Benefited

YOUR commission would urge that in every community, where and to such extent as may be practicable, consideration be given to the advisability of requiring extensions and rapid transit systems of subway and elevated to be paid for, not out of new capital invested through the medium of bonds or stock, which means for all time an added burden upon the car rider, but from special taxes assessed against the owners of property in the district the value of which is enhanced by such extensions.

This would not be a new principle; it would be merely the application of an old principle. The American property owner has been accustomed to contributing out of the increase in value of his property to the cost of building streets and other public improvements. The principle is peculiarly applicable to improvements of city transportation systems because of the enormous increases in real estate values created when new extensions open up new territory or when the creation of rapid transit facilities make outlying territory more available.

The City Club of New York, in 1908, a few years after the extension of the New York subway from 135th Street to 230th Street, in Manhattan, had been built at a cost of $7,375,000, made an authoritative study of new real estate values created by that extension in the district lying between 135th Street and 230th Street. After deducting $20,000,000 as a liberal estimate, based upon studies of parallel situations, of the natural increase in property values in that district which would have taken place without the subway extension, it was found that the increase in values clearly brought about by the subway extension was $49,200,000, an amount upward of seven times the cost of the improvements. The property in the district enjoyed an increase in value of 104 per cent. If, by assessment, it had borne the entire cost of the extension in the district, it would have still retained a new profit on the value of the land of 89 per cent, or an aggregate of $41,825,000 for the district. The Manhattan extension just referred to, together with the Bronx extension beyond 135th Street, cost $13,075,000. These two extensions directly created, in a limited area lying near these extensions, new land values solely due to the extensions, of $80,500,000.

Let it be borne in mind that the cost of the entire subway system from the Battery to 230th Street in Manhattan and to Bronx Park was about $43,000,000.

In Philadelphia recent estimates of improvements in land values expected from rapid transit projects in contemplation have been equally enlightening. Similar results would be certainly obtained in many other cities by studies similar to that made by the City Club of New York.

Is it not in accordance with the laws of economic justice, then, that the landowner, as such, should share his benefit of increased land values with the public? Instead of the cost, $7,375,000, of the Manhattan extension being borne by the owners of land in the newly served territory, it was capitalized and translated into an annual charge of $350,000 or more, a burden which had to be borne out of the car fares and which today helps to intensify the financial predicament in which the company finds itself. If the public pays out of its fares for the cost of maintaining and operating the line which will bring the outlying land owner such enrichment, should the latter not share with the public out of that enrichment, depending upon the degree in which he is benefited, by paying for or by helping to pay for the initial cost of construction of the line? That such a solution is just is rather significantly shown by the fact that in a number of cities land owners in outlying districts have offered spontaneously to contribute large sums to the company to assist it in constructing certain extensions. The present predicament of the street railway companies is in many places partly due to overbuilding, a fault traceable to political or business pres-

sures exerted by speculators in suburban lands who had little or no financial responsibility in connection with the street railway extensions which they caused to be built for their immediate benefit. This action of the suburban land owners of certain cities, on the other hand, is a significant expression of enlightened self-interest and a sound, constructive recognition of a fundamental principle of justice. The establishment of that principle by law, whether by changes in city ordinances, state statutes or state constitution, should, in our opinion, not be delayed. This thought is especially recommended to the attention of a number of communities which are now facing the necessity of extensions or rapid transit improvements.

Three points in this connection should be briefly touched upon: First, the amount of the assessment on any owner would probably have to become fixed by an appraisal some time after the construction of the improvement, and the owner should be given the option of paying his assessment in installments over a course of years. Consequently, the actual first financing of the extension might have to be by the city. Second, it will doubtless be urged by some that such a system for building extensions would lead to municipal ownership. On the contrary, it seems to us that, if properly administered, it could, by reducing the acuteness of the fare question, serve with much force to offset the pressure for municipal ownership. Third, as to the problems incident to allowing a private company, for a nominal rent and in return for undertakings as to repair and maintenance, to take over or use public property, similar problems incident to similar arrangements have already been ably and effectively handled in Boston and a number of other cities under state or municipal regulation in connection with subways and other structures.

If objection to the employment of such principles in constructing extensions be made upon the ground that public officers and land owners along the line of the proposed extension are thus given the power to vote such extension, let it be remembered that the problem of extensions is not only a serious financial problem, but is also essentially and finally a long-range social problem. The development of a city's street railways should be guided primarily not by the fortuitous financial experiences of a small group of bankers or real estate operators. It should be guided by the foresight and vision of those who are officially responsible for planning the city's growth and life, in terms of its water supply, its light, its streets, its sewers, its schools, its parks, its playgrounds, its civic centers, its night amusements, its community life, its libraries, its hospitals. It should be guided by those whose public duty it is to be interested in the health and happiness of the average city toiler and his family of growing children.

The call for municipal ownership today does not all emanate from dissatisfaction with the service in a narrow sense as riding facilities. It is largely an expression of feeling on the part of many that the street railway, instead of helping to make conditions bearable, is contributing to making them unbearable; that it is not, with the functions and powers which it exercises, accomplishing what it might accomplish to reduce the abnormalities of city life. While areas within the city remain undeveloped and unserved by adequate transportation, toiling thousands find themselves dragged out miles further—not to green lawns and spaces, but to a repetition of the same ugly congestion that they know in the city. The time will come when employers and educators will be forced to take cognizance of the impairment in working efficiency caused by such inconveniences as are suffered by the traveling public today. The time is approaching when cities will find it necessary to extend their street railways, not on the basis of new property values or the earnings of any single line of rails, but on the basis primarily of what will be most consistent with the public health and public economy.

These motives are strongly at work underneath our situation today. The public's control over stock issues, service, routes, extensions, etc., is needed today not only in order that as part of a plan for restoring the credit of the street railways the community's interest may be protected by the guarantee of efficient management, but also because the city of today is taking a more conscious, constructive interest in the city of tomorrow. That interest can be recognized and cared for under private operation if the public authorities have the suggested control. If such control does not come into effective existence, then one of the strongest forces making for municipal ownership will continue to exert an increasing influence.

Your commission trusts that this principle of paying wholly or in part for the construction of extensions out of special taxation of benefited property will be seriously studied and adopted, where possible. It seems fundamentally sound. While its adoption presents legal difficulties, as has the adoption of many another newly recognized industrial-economic relation, it holds great promise for reducing the financial problems incident to public transportation.

Rate of Return

IT IS an axiom that property devoted to the public use should secure a fair rate of return. Where money is represented by bonds the return is a part of the contract and is not changed during the life of the contract. Where capital is represented by stock the rate of return may vary according to the operating or financial conditions, and naturally it should compare favorably with the income upon other classes of investment. The undisputed testimony proves that the rate must be certain as well as reasonable to attract capital and that the absence of either of these essentials will frighten the investor away. It may be a lamentable fact, but it is nevertheless true, that most of the electric railways are obliged to go to markets outside of their territory to secure new capital; and under existing circumstances the investor is no longer willing to place his money in speculative properties. The experience during the war period has taught investors that a fixed franchise fare fails to meet the requirements of the industry and there is no dissent from the suggestion that such a fixed fare is a relic of a bygone age.

There are certain conspicuous examples of an adherence to a contract fare which may be referred to, but they do not affect our conclusion that the rate of fare must be subject to prompt revision according to the needs of the particular property.

The Regulation of Public Utilities

THE foundation stone of the relations between the communities and the companies must be the local authority under which they are permitted to conduct business. Since practically in all states the local government alone has the power to permit the use of highways by electric railways, the primary authority is the franchise grant or agreement containing the permit. Franchises are of varying terms and conditions. Until recently the franchises were generally limited to a certain number of years, but now it seems to be the settled conviction that such contracts are inherently imperfect. A reserve fund set aside during the term to take care of the property at the expiration of the franchise would result in increased charges for service; and, upon the other hand, the failure to take care of the investment in this way leaves the company at the will and caprice of the public. Instances have been referred to in this record where the railways are having difficulty in securing new franchises, while in some communities there seems to be a disposition to take over the property for junk values. Under these conditions it is natural for the company to neglect maintenance and give poor service. From the evidence it appears that there will be difficulty hereafter in securing new capital for properties that are governed by such franchises.

The undisputed testimony favors an indeterminate franchise by which the company is permitted to operate subject to the right of the public to take over the property by paying its value or agreed price. Such contracts protect both the investment against confiscation and the public against extortion by providing for payment of just compensation for the use of the property. The indeterminate franchise has been most thoroughly developed in the State of Wisconsin and it has been rec-

ognized in the District of Columbia, and the States of Indiana and Massachusetts. Its earlier adoption by other states and communities would have prevented many conflicts and misunderstandings. We believe that this form of franchise should receive the favorable consideration of the public.

Prior to 1907 the regulation of electric railways was principally confined to the municipalities. The history of this industry is replete with examples where municipal corruption has resulted from this control. The street railway is, however, an essential local institution and it cannot permanently prosper unless it has the confidence and co-operation of the public which it serves.

Since 1907 many states have taken over the control and regulation of this service and the communities within those states have been deprived of all jurisdiction. While the evidence shows that exclusive state control is preferable to exclusive municipal control, yet there appears to be a happy middle ground by which the municipalities may exercise control of the things that are peculiarly within their province and the state retain jurisdiction over all other matters and also exercise supervision over the action of the local tribunals. No general rule would fit all cases.

We have street railways which do not extend beyond the limits of a city; others where two or more systems operate in the same city, while frequently a single company operates in, through and between a large number of cities and villages. In New Jersey one system serves practically the whole state and the same condition exists in Connecticut. Manifestly no rule of thumb can apply to these different conditions. The tendency is to extend the mileage and service of street railways and to unite different companies under one management, and as our cities and villages grow and the rural country becomes more populous and prosperous these electric railways will extend their lines to meet the growing demands. Under such conditions, safety, efficiency and economy will be promoted by extending to a superior regulatory board the control of the practices, rules, regulations, security issues, the system of accounts and the charges to be paid for the service.

Effective local control is well-nigh impossible where a single company spreads out over an entire section of the state and this condition even constitutes a serious obstacle to municipal ownership. Where the street railway company operates wholly within one city there can be no insuperable objection to exclusive municipal control, when the people are ready and willing to exercise it. Secretary Baker testified upon this point as follows:

> Because I think the responsibility for the management of its own affairs is the greatest educational influence that the city of Cleveland has. The fact that the people of the city had studied and grasped and solved an intricate and complicated problem like the street railway problem has made them a more self-conscious and a stronger more virile people than they were before that problem was put up to them; and I should be sorry indeed to see the responsibility for their own affairs in as intimate and important matter as street railway service taken away and transferred to a state agency.

Cleveland has made a more intensive study of the electric railway problem than any other city in the country. Intelligent regulation cannot be secured without the assistance of expert operative, statistical and engineering departments and these are expensive items in any municipal budget.

In some respects uniformity is not only desirable but essential. This applies to the control of security issues, to accounting, the study and determination of depreciation and the control of such funds, fixing reasonable maintenance standards and their enforcement and the methods and principles to be employed in valuing properties, either for rate-making, capitalization, condemnation or purchase. In a general way the rules and principles which may be applied to the electric railway industry will be found available for other utilities such as telephone, electric light, heating, power, gas and water companies. In our judgment the state public service commissions should determine finally these matters, subject, of course, to an appeal to the courts where they err in judgment or transgress the law. Regulation by municipalities should be subject to an appeal to the state public service commission, thus bringing to bear upon the question involved the judgment of a body of men somewhat aloof from local influences. This would place the final authority in the state, and surely the communities, which are but subdivisions of the state, should prefer to submit their cause to a state tribunal in preference to a court, which rarely, if ever, has any regulating experience.

Theoretically, state control is removed from the influence of community prejudices. It certainly exercises its functions with a more judicial attitude and with greater equity to both the communities and the companies; probably it is in most instances more economical and more efficient, since the state can create a better and more comprehensive organization for regulation at less cost. State control obviates conflict of authority between communities that is bound to obtain when utilities operate beyond the limit of a single municipality. It makes unnecessary the erection of metropolitan or public utility districts in order to secure uniform regulation and it also results in a large saving to single communities which would otherwise be obliged to maintain its expert departments to perform this service.

The possibility of combining the best features of state and local regulation through a division of powers and duties was suggested by several witnesses and has been carefully considered by this commission. It would seem to be desirable to leave to the communities, at least in the first instance, the determination of such questions as the assignment of streets upon which the railways may operate, questions involving speed, stops, schedules, rerouting of cars and service during peak hours and otherwise, the extension of tracks, rate of fare, and the securing of certain statistical information where such information does not directly interfere with the accounting rules which have been prescribed by the state. Under these conditions the cities would be compelled to take a direct interest in the transportation business, leading to a more wholesome co-operation between the public and the railway. We believe this principle is worth trying, because it places the initial regulating responsibility upon the community, thus leaving the way open for sympathetic understanding and co-operation between the public and the industry, without which the industry cannot survive, and yet places the final responsibility upon the state, which is best equipped to determine the questions involved in a sane, consistent and impartial manner.

In a number of states, commissions now have complete authority over all questions. There should be no change if the people are satisfied with that policy. It has unquestionably worked well in most of those states. We do, however, desire to emphasize our belief that any form of regulation will fail of its purpose if it does not secure public co-operation in the conduct of the utility. Our study of conditions as they exist in the principal cities of the country has shown that unless the local public is in sympathy with the purposes of the management and lends assistance in their achievement, neither efficient or economical service is possible. Co-operation cannot be obtained unless the public be informed as to all phases of the electric railway problem—financial, economical and operating—and will not be continued unless the process of information is continued. This psychological factor involves a continuing task of undoubted magnitude, but whatever the regulatory authority may be, and however great the difficulties, the duty involved must be performed if the relations of the public and these highly essential utilities are to be maintained upon a basis that will insure proper service.

The electric railway problem admits of a satisfactory solution once the elements that compose it are made known and the processes of ordinary economic and business common sense are applied. The duty of both the public authorities and those who control the electric railway enterprise of the country is plainly indicated. The time has come for a permanent and satisfactory settlement of the traction question. The interests of both the public and the companies lie so exactly parallel in almost every respect that there ought not to be any serious difficulty in arriving at a solution if both parties approach the subject in a proper spirit.

Service-at-Cost Plan

THE electric railways have responded to the improvements in the arts and sciences, and it may also be said that the science of regulation has fairly kept pace with the requirements of public service and the growth of the industry. Franchises have been the result of experiment. The contract fare established an unsound rate basis, and in some instances commissions were slow to reach conclusions in rate cases. Investors lost confidence in the electric railway business. It was thought that a contract must be evolved which would meet all the requirements of the industry as well as of the public. Thus came the cost-of-service contract. It has worked well in Cleveland during the most difficult period in the history of the industry. It seems to have worked fairly well in the other cities where it has been tried out, and to justify the following statement made by Secretary Baker:

I believe that any community in America will pay cheerfully and willingly whatever rate of fare is necessary to carry the people on their street railroads and to maintain good service in their communities, if they are sure that they are paying only proper operating expenses, proper maintenance, and a proper return on capital.

Practically all of the witnesses for the electric railway industry favored service-at-cost franchises. That service should be provided at cost is not a new principle in the regulation of public utilities. It is back of all public service commission regulation, and expresses the reaction from the original contractual relations between utilities and communities under which fares were fixed and limited, while return was not. The application of the term "service-at-cost" in recent working agreements between the electric railways and the cities of Cleveland, Cincinnati, Dallas, Montreal, and to a limited extent the city of Boston, does not clearly describe such agreements. They are, in effect, devices for automatically and quickly adjusting price to cost. It is, therefore, not so much the principle back of such plans as it is the method provided for carrying that principle out that concerns the commission in this phase of the traction problem. Without going into unnecessary detail, it will suffice to state that the main features of the contract are:

(a) Fair valuation of the property;

(b) Capitalization to conform thereto;

(c) Agreed return upon capital;

(d) Public control of capital issues, and, to a certain extent, over expenditures;

(e) Public supervision over management, operation and service;

(f) Automatic changes of rates to meet fluctuating economic conditions, and to insure a proper return on the value;

(g) Private operation, subject to the right of the municipality to purchase the property at its value or upon an agreed price;

(h) Reduction of taxes and assessments.

The service-at-cost contract is still in its experimental stage, and naturally a number of criticisms have been made of it. These have been considered, but with the limited experience under this contract we believe that the criticisms are more theoretical than real. If these defects prove to be substantial and result in unduly increasing the cost of service, they can be removed by improved regulation, but if they cannot finally be avoided, then it would seem that the public has ample protection in the contract's purchase provisions.

Generally speaking, the main criticism of this form of contract is that it tends toward inefficiency and uneconomic operation; that it contains no provision for the control of strikes or uninterrupted service, and that labor and management may co-operatively increase the cost of operation to the point where the public may be unduly burdened.

From the point of view of credit restoration, the outstanding advantage of this contract is that rates are automatically adjusted to meet changing operating conditions. We are inclined to think that the assurance of an automatic adjustment of fare will do more than anything else to restore the confidence of the investor in these properties. Public confidence will be immeasurably strengthened through the valuation of the properties, because the figure that is established constitutes the basis of the return to the investor and fixes, at least, the minimum price which the public will be obliged to pay if, at some future time, it should decide to purchase and operate the property. When the value is thus fixed there can be no further dispute as to capitalization or excessive profits, because the people will know just what they are paying for. The controlling element in its favor is the restoration of public confidence in the corporation due to the removal of those elements of friction which have so frequently engaged the attention of the public. It might also be said that to a certain extent it removes the railway from the idea of speculative gain and places them upon a common-sense business basis where the people pay for the service they get and where the opportunity for large profits no longer exists, since economies and lower operating costs are reflected in reduced charges for service. When the contract is once established the opportunity for municipal corruption is reduced to the minimum.

We strongly recommend the principles of the service-at-cost contract, not as the only solution, but as one means of solving a very difficult problem.

In cases where the electric railways operate in more than one municipality and between different municipalities, such service-at-cost contracts can properly, in our judgment, be made only with the public service commission, and in such cases the provisions of the contract should apply in any particular community to the system as a whole rather than to its individual parts.

Public Ownership and Operation

IT is urged by many that public regulation of the street railways has failed and that the properties should be taken over by the municipalities or the state. Dr. Delos F. Wilcox concluded his able and interesting analysis of the testimony given in this connection with that suggestion. Some members of the commission individually feel that eventually municipal ownership might prove generally desirable and that there may, perhaps, be communities in the United States in which on account of the responsibility of the local government and the acuteness of the present conditions municipal ownership should be resorted to. The experiences of Boston, San Francisco and Seattle are being watched with great interest, but they have not continued long enough to justify any conclusion as to the relative merits of public as against private operation. The commission is unanimous on this point: that there has not been sufficient experience with public ownership and operation of street railways in this country to enable us to recommend it as the permanent solution of this problem. In some of the foreign countries it has apparently worked well. We do not believe under present conditions that this method of operation would be successful in most of the cities of the United States today.

Aside from the serious question whether municipalities as at present organized can operate electric railways as efficiently and satisfactorily as private enterprises, our conviction upon this subject is based upon the great political difficulties which would have to be overcome, such as constitutional amendment, legislation and the fiscal burdens incident to the purchase by cities of great public utilities, and upon the further fact that in many sections of the country the lines of the railway extend through many cities and villages and into rural territory. It is assumed, however, that these latter difficulties could be mastered by a community thoroughly awakened to the necessity for such a change.

We are certain that much can be accomplished by private initiative, stimulated and aided by thorough public regulation; that the final solution could, in many communities, be found under private management, and that in any event the reforms which have been urged by the commission should be instituted, since these reforms would serve to place the relations between the street railway and the public upon a more just and equitable basis.

Conclusions

WE have conceived the scope of this inquiry to be to ascertain, first, the actual financial and service condition of the electric railways of the United States at the present time; second, the causes which have contributed to such conditions; third, what readjustments of the relations between the electric railways and the communities which they serve must be brought about in order to restore the confidence of the public and to put the companies upon such a financial basis for the future as will enable them to render continuous and efficient service to their respective communities.

We have not entered into a minute discussion of the different franchise provisions throughout the country, nor have we undertaken to suggest any details which should be incorporated into any new contract, but have preferred to confine ourselves to suggesting the broad outlines of such new relations.

The commission is not pessimistic as to the future. The electric railway problem admits of a satisfactory solution, once the elements that compose it are made known and the principles of ordinary economic and business common sense are applied.

The duty both of the public authorities and of those who control the electric railway enterprises of the country is plainly indicated. The time has come for stable and satisfactory settlements of traction difficulties.

The commission can go no further than to point out the principles upon which the readjustment should be based. The task is really that of the state and local authorities upon the one hand and of the companies upon the other. Failure to rehabilitate the industry and the service is possible only if those upon whom the responsibility rests fail to undertake the work or pursue it in a spirit that makes settlement impossible.

Respectfully submitted this 28th day of July, 1920.

(*Signed*) CHARLES E. ELMQUIST,
Chairman,
(*Signed*) EDWIN F. SWEET,
Vice-Chairman,
(*Signed*) P. H. GADSDEN,
(*Signed*) W. D. MAHON,
(*Signed*) ROYAL MEEKER,
(*Signed*) C. W. BEALL,
(*Signed*) LOUIS B. WEHLE,
(*Signed*) GEORGE L. BAKER

HOURLY WAGE RATES (CENTS) OF CONDUCTORS AFFILIATED WITH THE AMALGAMATED ASSOCIATION OF STREET AND ELECTRIC RAILWAY EMPLOYES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA AS OF JANUARY, 1920

(Exhibit attached to Commission Report. See page 403)

NOTE—The wages given in this table are for regular conductors operating the ordinary type of equipment on city service. The wages of motormen were in most cases the same, but on the Chicago elevated lines the motormen received 67 cents per hour, and on the Boston elevated lines the motormen received 56 cents per hour for the first 3 months, 57 cents for the next 9 months and 62 cents thereafter

City	First Three Months	Second Three Months	Second Six Months	Second Year	Third Year	Fourth Year	Fifth Year	After Five Years
Cities in United States								
Brooklyn (Surface Lines)	54	54	55	1st 6 mos.-55 2nd 6 mos.-57	57	57	57	57
Brooklyn (Rapid Transit)	52	52	52	54	57	62	62	62
Staten Island, N. Y.	40	40	42½	1st 6 mos.-42½ 2nd 6 mos.-45	45	45	45	45
Chicago (Surface)	62	62	62	62	62	62	62	62
Chicago (Elevated)	60	63	63	65	65	65	65	65
Boston (Surface)	50	55	55	60	60	60	60	60
Boston (Rapid transit) guards	53½	54	54	56	56	56	56	56
Newark, Hoboken, Jersey City, Paterson, Elizabeth, Camden, etc.	46	48	48	50	50	50	50	50
Detroit	50	55	55	60	60	60	60	60
Cleveland	55	58	58	60	60	60	60	60
Pittsburgh	49	52	52	54	54	54	54	54
St. Louis	50	50	50	55	60	60	60	60
New Haven, Hartford, Bridgeport, etc.	44	44	44	45	46	47	48	50
Fall River, Lynn, Lawrence, Lowell, etc.	46	49	49	51	51	51	51	51
Los Angeles	41	43	43	45	46	46	47	47
San Francisco	62½	62½	62½	62½	62½	62½	62½	62½
Buffalo	43	46	46	48	48	48	48	48
Rochester, Syracuse and Utica	41	43	43	45	45	45	45	45
Washington, D. C.	46	49	49	51	51	51	51	51
Providence	51	54	54	56	56	56	56	56
Cincinnati	43	46	46	48	48	48	48	48
New Orleans	38	40	40	42	42	42	42	42
Oakland	48	51	51	54	54	54	54	54
Richmond, Va.	37	37	37	38	39	40	42	42
Norfolk	43	45	45	47½	47½	47½	47½	47½
Seattle	59⅜	59⅜	62½	65⅝	65⅝	65⅝	65⅝	65⅝
Columbus, Ohio	41	43	43	45	45	45	45	45
Akron and Canton	43	43	43	45	48	48	48	48
Worcester	47	52	52	57	57	57	57	57
Louisville	41	43	43	45	45	45	45	45
Omaha	51	53	53	55	55	55	55	55
Denver	43	46	46	48	48	48	48	48
Portland, Ore.	58	60	60	62	62	62	62	62
Toledo	42	44	44	46	46	46	46	46
Atlanta	36	38	38	40	40	40	40	40
Youngstown	43	46	46	48	48	48	48	48
Springfield, Mass.*	$4.23	$4.68	$4.68	$5.13	$5.13	$5.13	$5.13	$5.13
Memphis	42	42	45	45	48	48	48	48
Spokane	46	46	47	48	50	53	53	53
Birmingham	40	40	40	45	50	50	50	50
Dayton	46	48	48	50	50	50	50	50
Jackson, Battle Creek, Kalamazoo and Lansing	40	40	40	42	42	42	42	42
Salt Lake City	39	39	1st 3 mos.-39 2nd 3 mos.-43	1st 9 mos.-43 last 3 mos.-47	47	47	47	47
Des Moines	51	54	54	57	57	57	57	57
Nashville	42	42	45	45	48	48	48	48
Scranton	46	48	48	50	50	50	50	50
Wilmington, Del.	51	53	53	55	55	55	55	55
Grand Rapids, Mich.	45	48	48	51	51	51	51	51
Erie	46	48	48	50	50	50	50	50
Schenectady	41	43	43	45	45	45	45	45
San Antonio	40	40	40	42	42	42	42	42
Portland, Me.	41	43	43	45	45	45	45	45
Trenton	46	48	48	50	50	50	50	50
Tacoma	50	50	55	55	60	60	60	60
Cities in Canada								
Montreal	37	37	37	40	44	48	48	48
Toronto	50	52½	52½	55	55	55	55	55
Vancouver and Victoria	45	45	50	1st 6 mos.-53 2nd 6 mos.-56	56	56	56	56
Winnipeg	39	39	41	44	47	47	47	47
Calgary	45	45	50	1st 6 mos.-55 2nd 6 mos.-60	60	60	60	60
Edmonton	35	35	37½	40	45	45	45	45
Ottawa	39	39	39	41	43	45	45	45
Halifax	38½	38½	40	41½	43½	43½	43½	43½
London	39	39	39	42	44	44	44	44

*Figures for Springfield, Mass., are per day.

President Wilson has written the following letter to Chairman Elmquist, of the Federal Electric Railways Commission:

THE WHITE HOUSE
Washington Aug. 14, 1920.

My dear Mr. Elmquist:

Will you not accept for yourself and be good enough to extend to the other members of the commission my sincere thanks for the very able and valuable report upon the electric railway situation, which you have placed in my hands? I am appreciative of the self-sacrificing efforts of the commission members in so freely devoting their time to the task undertaken at my request, but I cannot but believe that the results achieved will prove to be full compensation for their efforts.

I very much hope that this report will receive the wide publicity which it deserves and that it will be closely studied by all local regulative authorities having to do with the affairs and interests of public service corporations.

Sincerely yours,
(*Sgd.*) WOODROW WILSON.

MR. CHARLES E. ELMQUIST,
Chairman,
Federal Electric Railways Commission.

The Survival of the Fitter

At Terre Haute, Ind., Jitney Buses Have Dropped from 200 to 43 and Have Been Forced to a 10-Cent Fare During a Period When the Trolley Cars Have More Than Doubled in Number and Stayed at 5 Cents in the Face of an Enormous Increase in Private Automobiles



TERRE HAUTE, WHERE THE SAFETY CAR HAS DEMONSTRATED THAT BUSINESS FOLLOWS SERVICE

IT IS one of the freaks of nomenclature that the general manager of an electric railway which is more than holding its own should bear the name of Walker! That name has not been a handicap with his public, as will appear from the following record of what E. M. Walker has done on the Terre Haute lines of the Terre Haute, Indianapolis & Eastern Traction Company because of his thorough introduction of safety car operation on the basis that "Business follows service."

Earlier articles in the ELECTRIC RAILWAY JOURNAL have recited how this service was introduced line by line after due publicity and how the people of Terre Haute showed their approval and appreciation by patronage even greater than the increase in service. The purpose of the present article, however, is somewhat wider in scope, as it is intended to review a period that might be called "The Rise and Fall of the Automobile as a Competitor." It tells the tale of three significant years: 1913, when neither the private machine nor the jitney had made any real inroads upon the trolley; 1918, when it was evident that old-style electric railway operation could not live against the automotive vehicles of public or private character; 1919, when it was demonstrated that modern electric railway service can annihilate jitney competition where both cover the same route and that such modern service is helped rather than hindered by the riding habit inculcated by automobile ownership.

Terre Haute is one of those cities where it is possible for people of moderate means to own and use an automobile without feeling the pinch of garage rental. So the use of the gas wagon has grown there just as rapidly as in hundreds of other American communities. In 1913, when the population of the city alone was 60,000, there were but 900 machines; in 1918, 68,000 people owned fully 4,300 machines; in 1919, 72,000 people had 5,100 machines, and in the first six months of 1920, 75,000 people had 5,500 machines. This sixfold increase in seven years was matched in the non-city portion of Vigo County, where the number of automobiles rose from 300 in 1913 to 1,950 in 1920.

JITNEYS ARE NOW PRACTICALLY ON A HACKING BASIS

As if this lawful drain upon electric railway traffic were not enough, the company had to endure the unfair forays of the jitney, whose depredations began early in the World War. In 1913 this genus was unknown;

DIAGNOSIS OF JITNEY TRAFFIC, MARCH 4, 1920—PATIENT FAILING AND 10-CENT OXYGEN ORDERED AS A LAST HOPE

Weather—Rain, snow and cold, all day.
Periods observed:

6:45 a.m. to 8:10 a.m.	25	license numbers
10:45 a.m. to 12:10 p.m.	17	not observed in previous periods
4:30 p.m. to 6:00 p.m.	1	not observed in previous periods
Total number observed	43	

Routes—South Seventh
South Seventeenth
Twelve Points
East Locust

South Seventeenth and Twelve Points are in only partial competition with street car lines.

Number of jitneys observed on March 4	43
Number of jitneys observed with 1919 licenses	6
Number of jitneys observed with 1920 licenses	37

	South Seventh	South Seventeenth	Twelve Points	East Locust
Number operating all three periods	4	1	1	2
Number operating two out of three periods	3	5	2	4
Number operating only one period	4	1	9	3

Number of jitney buses operating on two different routes in same period: 1
Number of jitney buses operating one route in one period and another route the other two:

SERVICE BEGETS BUSINESS—SAFETY CAR OPERATION, COMPARED WITH ORIGINAL SAFETY CAR OPERATION A YEAR EARLIER, SHOWS THAT PATRONAGE CONTINUES TO OUTSTRIP ADDITIONAL SERVICE

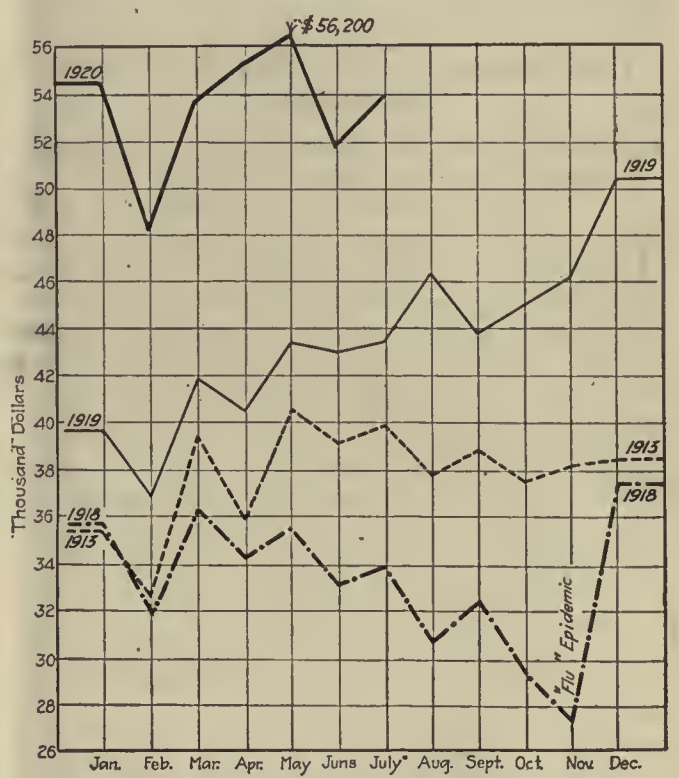
South Seventh and South Third Line..... Dec. 1 to 18, inclusive
North Eighth and Union Depot Line..... Dec. 11 to 18, inclusive
South Seventeenth Street Line..... Dec. 15 to 18, inclusive

	South Seventh-Third	North Eighth	South Seventeenth
Gross earnings, 1919.....	$6,370.45	$1,906.55	$852.75
Gross earnings, 1918.....	4,683.24	1,667.36	527.97
Increase over 1918.....	$1,687.21	$231.19	$324.78
Increase over 1918, per cent.....	36	14	61
Two-man car headway in 1918, min.	10	8	10
One-man car headway in 1919, min..	8	7	6
Increase in service, per cent.....	20	12½	50

by 1918 there were 200 making the trolley's life miserable. It was not until December, 1918, that the company began to install safety cars upon the general basis of cutting ten-minute headways down to eight, seven, six minutes or less. By the end of 1919 the number of jitneys had dropped to 125, and when 1920 rolled around not more than forty-three busmen were found willing to keep up the fight, and only thirty-seven of these men had "1920" licenses. Full surrender came April 1, 1920, with the announcement that on that date and thereafter the jitney fare would be 10 cents. Strictly speaking, this will reduce (or is it promote?) the jitney to a hacking basis, because quite a portion of the present service already is along trackless streets and therefore not in actual competition with the street cars.

FROM DARKNESS TO LIGHT ON THE ELECTRIC RAILWAY

The year 1913 had been one of the best, if not the best, years in the history of the Terre Haute system. With six tickets for 25 cents and no competitor except the human leg, a population of 60,000 had taken 9,507,018 revenue rides, or 11,978,801 rides in all, making the respective numbers of rides per inhabitant per annum 160 and 199.5. By the year 1918 the population had risen to 68,000, but travel had dropped so badly that the respective riding indices were only 120 and 157. Reference to the graphs of the three years will show that from March, 1918, onward there was a most discouraging sag in traffic, accentuated still further by the influenza epidemic around October, but with a sharp upward turn in November, which was kept and improved upon through the inauguration of some safety car service in December. Throughout the year 1919 the company kept on replacing long-headway, old-car service with short-headway, new-car service, until the end of the year saw every route in the city equipped at least in part. At first, Mr. Walker had held the opinion that thirty to thirty-five safety cars would be enough, bearing in mind that some of the twenty-eight old cars once regularly operated could be used to help during rush hours. The response of the public proved so gratifying, however, that the first thirty new cars hardly sufficed to half equip the system. An additional twenty-five were ordered, and even this number was not enough. Consequently, the company ordered ten more, which, with the first safety car, gives a total of sixty-six new cars, against the twenty-nine old cars which Mr. Walker found in service upon his advent in the latter part of 1917.



CITY RAILWAY EARNINGS TO THE NEAREST $100 BY MONTHS FOR 1913, 1918, 1919 AND FIRST THREE MONTHS OF 1920, TERRE HAUTE, IND.

VITAL STATISTICS OF THE SIGNIFICANT YEARS, SHOWING THE CONCURRENT INCREASE OF PRIVATE AUTOMOBILE AND ELECTRIC RAILWAY TRAFFIC DURING 1919 AND EARLY 1920

	1913	1918	1919	1920 (6 Mos.)
Population.....	60,000	68,000	72,000	75,000
Number of autos owned in city....	900	4,300	5,100	5,500
Number of autos owned in Vigo County outside of city.....	300	1,500	1,700	1,950
Miles of city track.....	30	30	30	30
Revenue passengers carried.....	9,507,018	8,160,492	10,351,042	6,389,040
Employees carried.....	309,515	259,139	302,662	184,738
Complimentary passengers carried	66,896	39,694	7,299	189
Transfer passengers carried.....	2,095,372	2,200,114	2,603,427	1,392,880
Total passengers carried.....	11,978,801	10,659,439	13,264,430	7,781,920
Gross revenue, city lines.....	$452,736	$394,824	$518,627	$319,452
Jitney buses in operation.....	0	200	125	43
Car-miles, safety cars.....	0	77,572	1,428,380	1,288,882
Car-miles non-safety cars.....	1,968,400	1,717,597	1,036,802	208,382
Total car-miles.....	1,968,400	1,795,169	2,465,182	1,497,264
Kw.-hr. per car-mile.....	3.87	3.52	2.67	2.29
Earnings per car-mile, all city cars.	0.2300	0.2109	0.2103	0.2133
Earnings per car-mile safety cars...	.....	0.2100	0.2110	0.2190
Safety cars operated.....	0	18(Dec.)	28	50
Non-safety cars operated.....	29	15	15	3
Total cars operated.....	29	33	43	53
Rate of fare.....	5c.	5c.	5c.	5c.
Tickets.....	25 for $1 6 for 25c.	25 for $1 6 for 25c.	None	None
Transfers.....	Yes	Yes	Yes	Yes

*Includes interurban cars at the average rate of 300 miles daily, on city track.

The heartening response of the Terre Haute public to rapidly improving service is indicated by the fact that during 1919, with a population of 72,000, the riding climbed up to 10,351,042 revenue passengers and 13,264,430 total passengers, equivalent to riding indices of 145 and 184 respectively. Significant of still better results to come was the fact that the original safety car routes of December, 1918, showed gains of 14 per cent, 36 per cent and 61 per cent respectively when checked up a year later—safety car against safety car. One may prophesy that when the sixty-six cars are available to give 100 per cent safety car service the *trolley car* riding habit of Terre Haute will be better than it would have been had there been no private automobiles and jitneys at all to interfere with the business of the old-style operation.

An interesting sidelight on the development at Terre Haute has been the local financing of the later purchases of cars. In a period when electric railway credit had ebbed to its lowest point, the company had little diffi-

culty in proving to the home folks that it had found a way to keep going. A second important point is that the company began installation of these money-saving and traffic-creating vehicles at a time when it had to ask no other increase in fare than the abolition of the cut-rate tickets as of Nov. 1, 1918. It has therefore had the advantage of operating under the happy conditions of a single-coin fare and a favorable public sentiment. There was a time, one may be sure, when the "Green Bugs" had many would-be squashers, but today there is a noticeable smirk of satisfaction on the face of every Terre Haute citizen who sees one of the numerous delegations that visit his burg to see how it's done!

Ole Hanson Discredits Municipal Ownership

Seattle Took Over the Traction Lines to Eliminate Politics, but Experience Shows That Lines Were Thereby Put Into Politics

THE famous ex-Mayor of Seattle, Wash., Ole Hanson, recently appeared before the Chicago Association of Commerce and spoke freely of the experience which has been had in Seattle subsequent to the purchase of the local traction lines by the municipalities. The views of Mr. Hanson, based on actual experience, were of particular interest to the citizens of Chicago, for Mayor William Hale Thompson and his political machine are trying by every means possible to bring about an end to the control of the local utilities by the Illinois Public Utilities Commission and to establish municipal ownership and a 5-cent street car fare.

Mr. Hanson's speech follows in part:

In discussing municipal ownership and operation of public utilities I do so only from the light of experience. I have cast theories into the discard. The stern facts, unpleasant as they may be to many, are illuminating, I think, to those who seek the truth.

I will tell you about our street car line. For years we had had the usual fight between the private corporation and the city government. Both were unquestionably to blame, and, because of their equality of wrongdoing, both had red entries in the ledger, when, by co-operation and understanding, both the citizens and the company would have been better off.

The war was on. I believed with others that the company was making money—plenty of it. Were not the cars crowded; didn't I have to stand? Were they not carrying more and more people daily? Yes, but when we "experted" the books we found that it was costing them more to operate every day, and that the more business they had the greater the loss. The government demanded better transportation for the shipyard workers, extensions, new equipment, etc. The company said: "We have just refunded a $12,000,000 bond issue and we paid 9½ per cent and do not know where we can get any more money."

After due consideration, the city of Seattle offered the company $15,000,000 for the car lines, houses, real estate, etc. The company accepted. Even then the city government did not close the deal, but submitted the proposition in plain words to the voters of Seattle. Every one was for it. It was a war measure and recognized as such. The Chamber of Commerce, the Central Labor Council, the building owners and every organization in Seattle approved the deal. The people voted and the vote stood over 4 to 1. After some months of legal quibbling, the council O. K.'d the deal. On April 1, 1919, we took over the physical operation of the lines.

Things Go Well for a Time

We had a superintendent of public utilities who was fearless, brave and honest. He inaugurated skip stops, one-man cars, and we had better transportation. We carried more passengers; we raised the pay of the workmen and, by careful, efficient business methods, success seemed certain. Then my health and poverty compelled me to resign. But a splendid man was chosen in my stead. He retained the same superintendent, but election day came nearer and nearer and, as three of our Council had to be re-elected, a change in vote was duly recorded in the Council chambers. Improvements which would have saved money were blocked; extensions which should never have been made for years were made at once; everything the lobby of special interest citizens wanted they got.

The superintendent pleaded and cajoled and begged, but the Council, which had voted to buy the car lines, were influenced by political considerations and progress was checked.

Then three candidates for Mayor filed and, to my surprise, the street car line became the dominant issue. The candidate who promised each section the most in service, extensions, etc., received the most cheers. The candidate who agreed to turn the management of the street cars over to a man without either courage or ability, but who would never fire a man or punish him, received the support of the car men and their friends.

Instead of taking the utilities out of politics they became the football of politics. When the votes were counted, the greatest promiser was elected. He fired the competent superintendent and appointed a political friend, and we realized what we were up against.

The first month the city operated the cars, April, 1919, it cost for operation 23 cents to run a car one mile. In the month of April one year thereafter it cost 31 cents to run a street car one mile. The average speed was greatly reduced. We had just been able to get by on a 5-cent fare. The fare today is 10 cents for a single ride—four tickets for a quarter. The present Mayor advocated at the beginning of his term the taxing of the citizens to pay for the car line. Verily, municipal ownership meant more than we thought.

Politics Fatal—Private Operation Better

In my best judgment, municipal ownership and operation of transportation lines, or any other utility where great numbers of men are employed, will never be really successful unless the great mass of people decide that brains are worth money, and that the men in charge are trained, competent, high-class men who can earn as well as receive as good compensation from the cities as they get in private employment. The spoils system must be abolished and the street car operated for efficiency and service and not for feathering some demagogue's political nest. The people themselves must agree that the car rider must pay for his ride and not the taxpayers, who, often, under some guise or other, are made to carry a part of the load. The employees of the city must be subject to the direction of the city officials and not of any outside body on the face of the earth. The employees must be paid a fair wage, and it should not be greater than the wage paid for similar employment in private life.

However, after due consideration, I am of the opinion that, under proper and just supervision by commissioners that are fair, the private company can furnish transportation at less cost than the average city government. Politics apparently cannot be kept out of the business of our municipalities, and politics is fatal to success.

I believe absolutely that the car rider must pay for his ride and not the taxpayer. I believe the capital invested in public utilities must be allowed to earn a fair and sure return on its investment. It is not true that the company's interest and the city's interest are opposed. Sometimes the corporations and sometimes the politicians have fostered this opposition, but it is wrong fundamentally.

Chicago is but at the beginning of its career as a city. Hate and strife will simply check Chicago's growth, hamper its future and delay its arrival at its sure destination of being the largest city in the world. The city's business is your business. The public utilities intrude upon every hour of your life. Any waste or unnecessary expense is simply loss to your city, to yourselves.

A commission has been appointed by the Warsaw government, according to a statement in the *Tramway and Railway World*, London, to gather information on the present position of the Polish railways and on electrically operated systems in other countries. The commission will then report to what extent it may be desirable to undertake the electrification of the Polish Railways.

Progress in Rail Joint Construction

Recent Developments in Rail Joint Construction Make This Subject of Particular Interest and a Review of the Progress Made Should Be of Benefit

By R. C. CRAM
Engineer of Surface Roadway Brooklyn (N. Y.) Rapid Transit Company

BOLTED joints as well as the several types of welded joints have been given much careful study and experiment during the past few years and an attempt will be made to outline the progress made. In a general way, the form followed is that given in the progress report on rail joints presented in 1910 by the committee on way matters of the American Electric Railway Engineering Association (Proc. 1910, page 58).

The 1910 report gives the elements necessary to obtain a perfect rail joint, as follows:

1. The joint should prevent independent motion of the rail ends during the life of the rails. 2. The joint should be mechanically strong and should be such that the rail at the joint will be equal in strength and stiffness to the rail itself. 3. In the application of any joint it is essential that the top surfaces of the rail lie in the same plane.*

It is to be noted that any joint that is suitable for paved tracks, the application of which does not result in continuous rails, will also be suitable for use in open track.†

The 1910 way committee report commented particularly upon the channel bar splice plate as used for girder rail joints and noted the tendency of these to buckle under loads applied in drawing up the bolts. A change in design was suggested in the proposal that the plates be made slightly concave to the web with the idea that the plates would flatten out and become practically vertical when the bolts were tight. This has been tried in a few designs such as that for the L.S. Co., section 95-400, but it is believed that the scheme has proven somewhat impractical, since it places too much dependence upon the strength of the bolts. The later, and what is considered the better, practice is to provide plates of greater thickness along their center lines and having a "bridge" shape providing ample clearance for concealed bonds, together with greatly increased bearing surfaces, such as the joints for the 7-in. and 9-in. grooved girder and 7-in. plain girder rails of the Engineering Association (see Engineering Manual, Wm 5a; Wm 4b; Wm 6a). Experience with the Engineering Association joints of the plain bolted type for 7-in. grooved girder rails has indicated that these joints are a vast improvement over any previous designs for simple mechanical joints and it is the writer's belief that the "bridge" type of plate is now being used quite extensively for bolted joints in grooved girder rail work.

Along this line, attention is called to the "recommended design" for similar "bridge" type of plates for the Engineering Association's recommended design of 7-in. 80-lb. and 7-in. 91-lb. plain girder rails, as found in the Engineering Manual, Wm 6a. The writer understands that these plates have never been rolled, but they have great merit, and it is hoped that the companies will take up their use with these rails so that information may be developed as to their value as compared with the manufacturers' design now in use.

*The writer would add to this that the same thing may be said with respect to the rail bases, particularly where a base-support type of splice bar is to be used.

†To this the writer would add a fourth item as follows: 4. The joint should have a conductance at least equal to that of the rail section to which it is applied.

It is quite certain that better results would be secured with plain bolted joints for girder rails if the splice bars and bolts were heat-treated and the subject should have further attention. As noted hereafter in remarks upon joints for open tracks, it is also quite certain that proper tests would clearly demonstrate that long, heavy 12-bolt joints are no more efficient than shorter heat-treated 8-bolt joints for deep girder rails. Some companies insist upon using 8-bolt joints for 7-in. grooved girder rails. Here again it may be remarked that heat-treated splice bars with single-row 6-hole drilling are probably just as efficient, and marked savings in joint costs can be had through a careful study of these features.

It is hardly necessary to repeat that it is the general practice to lay rails butt-tight in paved street work, no matter what kind of joint is used. The bugaboo of expansion under such conditions has long since been banished. But where bolted joints are used in pavements, attention is called to the suggestion of the 1910 committee on way matters to the effect that the holes in the rails for bolted joints should be only ☆ in. larger than the diameter of the bolt to be used. It is thought that current practice now goes even farther and requires the holes in the rails to be ☆ in. less than the diameter of the bolt, and that the hole shall be reamed during application of the plate to the diameter of the bolt, securing a reamed tight fit, all of which tends to prevent future play.

OPPOSITE VERSUS STAGGERED JOINTS

There is an increasing tendency toward placing joints opposite each other in paved track construction. This is particularly true where cast welds and other forms of welded joints are used. With cast welds it is very desirable so to place them in order to lessen the rocking motion imparted to cars by "staggered" joints where some of the joints are "cocked" up above the general level of the adjacent rails.

The "opposite" method permits shop punching of tie-rod holes. It is only necessary to pair the rails for length in order to have the shop-punched holes come opposite in the street. Damaged railheads are often found opposite "staggered" joints, where the latter become defective. Such damage lessens the relaying value of these rails.

The chief disadvantage that may be ascribed to "opposite" joints is the fear that in event of both joints becoming defective there would be more trouble from noise and derailment. However, this is not a serious matter because of the marked improvements in all forms of joints and "opposite" welded joints are known to have been in service more than twenty years without causing such troubles from their failures.

Where bolted joints of the base-supported type are used it is necessary, if the "staggered" method is followed, to install tie plates of a thickness equal to that of the base flanges of the joints on the ties opposite the

joints. Otherwise the rails will not lie in the same plane unless the ties are adzed to receive the base flanges of the joints. Either scheme is expensive and the "opposite" method obviates these difficulties.

Observation of special trackwork has also indicated that "opposite" joints in the curved rails and other parts are not objectionable provided the joints are of proper design and carefully installed with bolts of high tensile strength.

The statement made in the 1910 way committee report can be repeated as follows: "It appears that tracks in paved streets should be laid with 'opposite' joints."

Some form of bar which provides greater strength than the ordinary angle bar is believed to be necessary, and patented joints such as the 100 per cent, the Duquesne, the Bonzano, the Continuous, the Weber, the Wolhaupter, the Superior and the Abbot are widely used. The patents on several of these joints have expired.

The tendency toward the use of heat-treated bolts of high tensile strength is also recognized and good practice now requires their use. Such bolts are included in the recommended specifications of the American Electric Railway Engineering Association for material for use in the manufacture of special trackwork (Eng. Man. Ws 4b). It is also to be noted that the use of heat-treated angle bars is increasing. The Pennsylvania Railroad has conducted an important series of tests to ascertain the relative stiffness of its standard joints under transverse load with the view to increasing the stiffness either by change in design or by heat treatment. The results showed that while ordinary rail joints have a lower elastic limit than the unbroken rail, joints made with bars of suitable design and heat treated have elastic limits higher than the continuous rail. The complete report, in Appendix G attached to the report of the committee on rail of the American Railway Engineering Association, Proceedings, 1919, Vol. 20, page 561, is worth study by electric railway engineers.

The principal points brought out are: (1) Plain angle bars properly designed and heat treated have an efficiency, at lower cost, equal to continuous joints and slightly greater than Bonzano joints untreated; (2) heat-treated plain bars should only be used with heat-treated bolts; (3) heat-treated bars should only be purchased under specifications and inspection which will insure that the treatment has produced in the bars the properties which are essential in order to secure results equal to those found in the tests; (4) it appears that there is nothing to be gained in strength under transverse loading by using a 6-hole instead of a 4-hole joint; (5) no loss in efficiency is to be expected from a reduction in the length of the splice bar to 18½ in.

As these tests were made on joints for 100-lb. standard section rail there may be some difference in results from similar tests of joints for 80-lb. rails, which are extensively used by electric railways, but it is probable that proportionately similar results would be found in similar tests.

This is certainly a matter which could well be investigated by the American Electric Railway Engineering Association.

Some Conclusions by Mr. Cram

1. The importance of rail joints and their direct influence on roadway structures cannot be overestimated, as the effect, both directly and indirectly, on the service, maintenance, public relations and reputations in the community can too often be traced largely to shortcomings in the design, application or serviceability of the rail joints employed by the railway company.
2. It has often happened that a particular type of rail joint has been employed on important track structure without proper consideration being given to the exact qualifications a joint must possess in order to meet the service required. Consequently, the lack of such qualifications, in the type of joint finally adopted, has resulted disastrously for want of reliable engineering knowledge.
3. The importance of thorough grinding of all rail joints of whatever type to a true head surface cannot be emphasized too strongly. Way engineers should be permitted to have a sufficient number of grinding machines to permit joint grinding immediately after installation.
4. Way engineers have been devoting time and money to the development of too many specialties in rail joints. An attempt should now be made to combine their experiences in some practical way which will result in a satisfactory solution of the joint problem.
5. A most business-like way of accomplishing this task would include the performance of a series of carefully planned tests, including physical and chemical analysis and a scientific examintion of every type of joint and welding process in current use in the industry. This should be done by the American Electric Railway Engineering Association and in co-operation with an unbiased authority such as the United States Bureau of Standards.

Few Welded Joints in Open Tracks

The use of welded joints in open tracks has not been very extensive. The reason for this is principally that there are difficulties in providing for expansion and contraction. Some lack of facility in repair of failures has also been feared. It is probable that the benefits accruing from a continuous rail in tracks of electric railways, where the rails carry the return circuit and where the costs for joint bonding are high, have not been thought sufficient to offset the greater cost for maintenance of bolted joints. It may be a surprise to some engineers to learn that a long stretch in one of the tracks of a four-track high-speed electric railway system in New York City has been in operation with electric bar-weld joints since construction in 1907. The tracks are in open cut. There have been few joint failures and no troubles have developed from the use of the necessary expansion joints. The rails are 80-lb. A. S. C. E., and the joints will no doubt outlive the rail. The results of this test should tend to overcome the dislike which way engineers have for continuous rails in such situations.

Special Forms of Bolted Joints Give Good Results

The riveted joint is considered as a special form of bolted joint. Where such joints are designed as simple structural splices, without providing either head or base support, they have failed signally. On the other hand, when proper plates have been provided, of sufficient thickness to withstand the tendency toward buckling under riveting pressure and with broad bearing under the rail head and upon the base, they have given fairly good results. Riveted joints were used in Cleveland as long ago as 1892.

The idea of embodying a combination riveted-welded joint was originated by C. H. Clark in Cleveland, Ohio, and the joint has since been successfully used in Baltimore and other cities. The original scheme consisted in

riveting regular channel-bar plates to the rail ends and then thermit welding the base of the rail and lower portion of the plates. This weld was intended to give the joint sufficient permanent conductance and provide a strut directly at the joint to prevent any vertical movement of the rail ends.

The cost of the equipment and tools required when calculated to include all items was found to be such as to make the cost of the joints higher than many others. Here the arc welder was employed to reduce the initial cost of such joints, which resulted in arc welding of a portion of the edges of the plates to the head and base of the rails. This obviated the use of the thermit welding and reduced the cost of the joint considerably.

Through the efforts of H. B. Nichols, the Philadelphia Rapid Transit Company was successful in perfecting a composite joint, which for many years has been extensively employed on that system. This joint is composed of specially shaped plates well riveted to the sides and the bases of the rails. The voids between plates and sides are filled with spelter or similar metal to assure a reliable, uniform support to the head and to produce a permanent electrical contact. This joint has proven quite successful in the hands of the originator and his immediate successors, although it is believed its scope will be confined to Philadelphia, because the installation of joints of this type requires heavy apparatus of a costly nature and entails handling and maintenance problems of considerable importance, which are sufficient cause for other railways to avoid their use.

In recent years when continuous joints have been used in paved streets the practice of using machine-fitted bolts with them has increased. The rails and splice plates are drilled with circular holes fractionally smaller in diameter than the diameter of the machine bolts. The plates are held in place by drift pins while the holes are reamed to bolt diameter; the bolts are then driven home, and thoroughly tightened under car traffic.

Cast Welds Properly Made Are Satisfactory

There must be a reason why some railways continue to use the cast-weld type of joint, and those engineers who continue to use it claim that the results now obtained from this joint are equal to and in some cases better than those obtained by any other welding process, when based upon accurate statistics covering percentage of failure. The average annual percentage of failures for more than 15,000 joints upon one property is 0.004 per cent, with joints from one to eleven years old and an average age of four years. Furthermore, the electrical conductance test of these joints covering four successive years shows no appreciable change. This is a very important item in connection with any form of joint, and the one which continues to give high conductance throughout its life merits careful consideration.

The good results now obtained are largely due to extreme care in installation, the betterment of mold design and an appreciation of the fact that the metal must be brought up to such a height as to secure a thorough bearing under the rail heads. The failure to appreciate the last-named point has been the cause of more failures than any other one factor, and it may be noted that the overlooking of the same point with other forms of weld has contributed to their failures also in no little degree.

There have been claims made from time to time that the cast welding process injures the metal in the rail heads, tending to soften it through the sudden application of the hot metal. These claims were apparently based on the dishing or cupping which sometimes develops in the receiving rail head. However, most of this dishing has proven to be the result of either the failure to grind the heads to a true surface or to insufficient grinding. It has also been due at times to failure to keep the joint butt-tight during the welding, thus leaving a slight but often non-apparent "open joint" in the weld. This will usually cause cupping in any kind of a joint. Its effect is increased with the cast weld due to the anvil effect of the mass of metal which tends to resist the blows from the car wheels, increasing the force or effect of the blow, upon the head metal.

The writer understands that recent tests made by R. W. Hunt & Company, for the Twin City Rapid Transit Company, clearly indicate that the heat does not cause a softening of the rail heads.

The use of the thermit type of welded joint has increased of late. Since the report of the way committee on the thermit process of rail welding, in 1910, very radical changes have been made in that process of welding and in 1912 an entirely new method was perfected known as the "thermit insert" weld. It was necessary to make a radical change because experience proved that the first thermit weld, brought out in 1903 and 1904, in which only the base and flange of the rail were welded, was not of sufficient strength due to the fact that the head was not welded. The next development, made in 1908, was to cast-weld the entire rail section with thermit steel, including the head. This, however, developed another weakness due to the melting of the head of the rail and the softening of it at that point. The result was that a number of these welds showed bad indications of cupping. In 1912, however, the thermit insert weld was perfected. In this the base and flange are cast welded with thermit steel, as is also the head of the rail on the outside of the head. The head along the gage line, however, is not melted, but is compressed on an insert cut from rail steel and inserted between the heads of the rails before welding, the rails being spaced ¾ in. apart for this purpose. The high temperature, combined with the tremendous compression caused by the expansion of adjacent rails against the insert, serves to butt-weld this insert firmly to each side of the head of the rail, so that the final result is a weld of the entire section. This is then ground to form and is ready for service. The thermit insert weld was first installd in 1912, but was not used on an extensive scale until 1918.

The improvement brought about in this joint in addition to the butt-weld of the insert comprises the following very important points: (1) The amount of thermit required to make the weld has been reduced to practically half that previously required, due to the preheating of the addition to the thermit charge, the addition being packed in a sheet iron container and heated red hot at the time the rail is being preheated preliminary to welding; (2) a new method for luting molds has been perfected by which runouts have been practically eliminated. Asbestos strips soaked in molasses are placed around the rails just inside of the mold box. These are compressed betwen the mold and the rail and form a very effective luting. Powdered fireclay is then blown in under air pressure and, being caught by the molasses, tends to seal any small holes which might still remain. Should there be a break in the asbestos, making a runout possible, it can immediately be detected

during the fireclay test as the fireclay can be seen blowing out at that point. Such a defect can readily be sealed with the fireclay luting on the outside.

It is understood that no changes in method are contemplated this year except in certain apparatus. A smaller preheater is now being developed and possibly a small rail grinder will be put on the market.

Electric Bar-Weld Joints Have Demonstrated Their Great Strength

The 1910 report states that the weakness shown by the cast-weld, which is designated as "slip," also occurs to a degree in the electric weld. It is now believed that there were very few instances where the failure of electrically welded joints was due to a failure of the central weld. With the plain bar joint what may have appeared to be a "split" or failure of the central weld was in the great majority of cases caused by the loosening of shims due to excessive undercutting of the rail ends in the first instance, which prevented a firm bearing from being obtained over the entire rail ends and causing the bearing to take place only at the very top of the rail.

As the surface of the rail wore off under traffic this bearing finally became so slight that the shims did not remain in place, leaving an opening between the adjacent rails which caused a "pound" on the receiving rail and finally fractured the web of the receiving rail above the central weld. A failure of this kind, when viewed from the street surface, would give the impression that the central weld had failed, whereas the fact was that the web was split horizontally above the central weld of the receiving rail, but the central weld itself was as firm as ever.

In addition to the above many joints have been noted on which the receiving rail was very badly pounded and dished, but the central weld was still perfect. To overcome this difficulty the head support joint was brought out, in which spelter was poured into a space between the welded bars and the under side of the rail head. Experience proved, however, that while this was a step in the right direction it did not entirely overcome the trouble, owing to the gradual flowing out of the spelter from between the bar and the rail head as the head wore thin, and fractured rail webs on the receiving rail were still too numerous. The chock joint was then adopted. In this a drop-forged chock, several shapes of which are made to conform to various shapes of rails, is welded to the under side of the head of both rails and to the back of the head at the same time that the central weld on the bars is made. This really welds a portion of the abutting rails together and effectually overcomes any tendency of movement on the part of the receiving rail independent of the running off rail.

The chock type of joint is being used at the present time on nearly all girder rails and it is claimed that there have been no failures due to the receiving rail going down. It is claimed that there have been very few failures of the chock joint due to rail breakage, although on joints first installed there were some failures from chocks which had not been properly welded due to inexperience of the operators on this form of weld, and most of the failures were due to the parting of the chock from the rails without any fracturing of the rails.

The failure in bar-weld joints due to fracture of the rail at the end of the bars is not so much due to deterioration of the steel caused by the welding process as it is to the concentration of all of the stress on a small area of cross section of the web of the rail. When such joints withstand a tension of more than 400,000 lb. it shows how slight must be the deterioration which actually takes place in the metal due to the welding process. There is no other process of welding that will show the high tensile strength per square inch produced by the process of resistance welding and holding under pressure while the weld cools. The trouble is that in the bar joint the weld is applied to the weakest member of the rail, the web.

True Butt-Weld Made by New Process Applying Old Principle

A new process of butt welding of joints has recently been put on the market by the company which has long exploited the electric bar-weld process. It is, in some respects, a reversion to the earliest form of butt weld as originated by Elihu Thomson and it is being produced under the Jacobs patents. In this process a true butt weld is made between the adjacent rail ends and no additional metal is introduced at the joints. It produces a truly continuous rail, eliminating the joint entirely.

The rails are first placed with the ends about ½ in. apart, being held by a clamp with hydraulic rams for forcing the rails together after a welding heat has been reached. The rail-ends are surrounded by a clay mold, leaving a rectangular receptacle of which the rail ends form part of the side surfaces. The terminals of a 30 to 50-kw. generator are clamped to each rail, but no current will flow as long as the rails are not in contact. A melted flux is then poured into the mold, which provides a path for the current from rail to rail. The resistance of the flux causes it to heat very rapidly so that in a few minutes a temperature of 2,800 to 3,000 deg. is obtained, and the rail ends, being in contact with this hot material, are heated to a welding heat, at which time the rails are forced together through the flux and their entire ends are welded to each other. Grinding the burr off the head, groove and tram completes the process. In case a joint should break it is a simple process to grind off the burr on the under side of the head and tram, and on the top of the flange on each side, and to put on a pair of joint plates, without the necessity of cutting off a piece of rail, which is generally necessary for the repair of any other form of welded joint.

It is possible by the use of two independent clamps, one on each rail, to set one joint while the joint on the opposite rail is being welded, and a joint can be made in from 20 to 30 minutes. The actual time for the current to be on a weld is from 8 to 10 minutes. In Pittsburgh last December twenty-six joints were made by this process under very unfavorable weather conditions. One parted through the weld during the winter, but this failure was attributed to insufficient pressure due to trouble with the hydraulic pump caused by the cold weather.

The principal advantage claimed for this process is that the whole of the rail ends are uniformly brought to a welding heat due to the circulation of the hot flux over them, so that a homogeneous weld is produced over the whole rail section. However, the process is not available for joint repairs, owing to the need for drawing the rails together during the welding. In repair work the pavement prevents this.

The electric arc-weld joint is a new type of welded joint which came into use about 1913. Its use is an outgrowth from the use of arc-welding apparatus originally designed for the building up of cupped joints and hard centers in special trackwork. The universal use of welding apparatus for the latter purpose offers a comparatively cheap and convenient method of joint welding and, as a result, there are several such joints which have been installed with an insufficient knowledge of the proper methods and regardless of consequences.

Arc-weld joints are made up in two general forms, although there have been numerous modifications of these by individual railway companies by way of experiment. In one form, plates of special shapes are welded to the sides of the rail webs around their entire periphery. The plates are staggered in position so that the welding lines of one plate do not come opposite those of the other, preventing burning through. One form of this general type brings up the outside plate to a bearing for the support of the rail head, while other styles of plates of this type have a bearing on the bases only.

In the other general form, rectangular plates quite similar to plain joint plates are arc-welded along their top and bottom edges to the heads and bases of the rails. The structure thus formed is a box girder with a central rib (the rail web). In both forms the plates are held in place before welding by bolts or clamps. Both general types of joints have been used for repair of defective joints as well as for joints on new rails.

In the box type the web of the rail tends to prevent the adjustment of the members to the condition created by the welding. The plates are in a highly heated state, while the rails remain comparatively cool. Shrinkage stresses thus produced are often sufficient to draw up the rail bases at the edges, resulting finally in a fracture, either through the rail near the joint or in the weld itself. The web-plate type is subject to conditions which are more or less similar and an examination of several installations of arc-welded joints of both types reveals defective conditions which are very unsatisfactory. Many failures have occurred in the rails at or near the ends of the plates. Welded seams first crack and then give way, and once the failure is complete the entire joint usually has to be cut out.

It is understood that practically all of the failures in the web-plate type have been due to one of the following conditions: Failure to regulate current, resulting in either burning or melting instead of welding the electrode; attempt to weld rail covered with rust, cement or other foreign substances; use of wrong grades of welding steel; use of second quality rail very high in carbon; application of joints to rail ends already crystallized by pounding of car wheels and failure of operator to direct the arc jointly between the two members, resulting in failure to make a perfect weld.

Several schemes have been tried, or are being tried, for overcoming and reducing these difficulties. Some have failed, while others have not yet had time to prove their worth.

Essentials for Success of Arc-Weld Type of Joint

There is considerable apprehension as to the results which will ultimately be obtained from attempts to apply this process to high carbon steel rails. The arc-weld method is the one which requires the nearest approach to theoretically correct principles and its success will be based upon an accurate application of electric energy correctly measured by thoroughly skilled operators. The skill of the operator, however, is an essential to the success of any joint process.

The working conditions, materials to be welded and the welding material proper must be carefully considered. The use of special welding-quality steel plates of proper design, and of suitable welding rods and other materials composed and manufactured especially for this purpose, are very essential factors in producing even an approach to good results. There are altogether too many cases of promiscuous use of joints of this type where the conditions, materials and apparatus are neither known nor correctly used, while really skilled operators are exceedingly rare. These factors lead to doubts on the writer's part as to ultimate results which will be obtained from this type of joint when accurately compared with other types of welded joints.

It is thought that the subject of arc-weld joints is one which will bear very careful investigation and that the general application of such joints should not be taken up too hastily. However, the ease with which this type of joint may be installed by skilled operators, the simplicity of the apparatus proper and the economic features are so attractive that it is earnestly hoped that a successful solution of the difficulties attending the process may be found.

Make Anthracite from Bituminous

THE burning of raw bituminous coal is uneconomical, as the market for coal-tar products has made the volatile portion more valuable for other purposes. George Esherick, Jr., in a recent paper presented before the Kentucky Mining Institute indicates a process that will convert bituminous coal into a fuel resembling anthracite. The requirements of such a fuel are that it be smokeless, easily burned and cheap.

The process is as follows: Raw coal is crushed and fed continuously into low temperature horizontal retorts by means of paddles. The volatile products, i.e., tar, gas and ammoniacal liquor, are treated as in coke-oven practice. The residue which is continuously discharged from each retort is softer than coke, contains 8 to 10 per cent of volatile matter and burns readily. It could be used directly in a power plant as fuel under boilers, but is not in a condition to market for general use. In the next step of the process this semi-coke is ground, mixed with pitch, fluxed and passed through a briquet press. The raw briquets are then carried to inclined retorts and again distilled, dumped and quenched.

The yields of "carbocoal," as it is called, and the various byproducts depend on the coal used. A coal of the following typical analysis, moisture 3 per cent, volatile matter 35 per cent, fixed carbon 55 per cent and ash 7 per cent, will yield, per ton, carbocoal, 1,400 lb.; tar, 30 gal.; gas, 9,000 cu.ft.; ammonium sulphate, 20 lb.; light oil from gas, 2 gal.

The carbocoal has a B.t.u. content of about 13,000 and burns with a clean light ash. It has been used with success in several plants and a large plant for its production is now being erected at Clinchfield, Va.

Such attempts as these are preferable from a conservation standpoint, Mr. Esherick thinks, to attempts to pulverize or change raw coal without first extracting the byproducts. Power producers will watch the development of the process with interest.

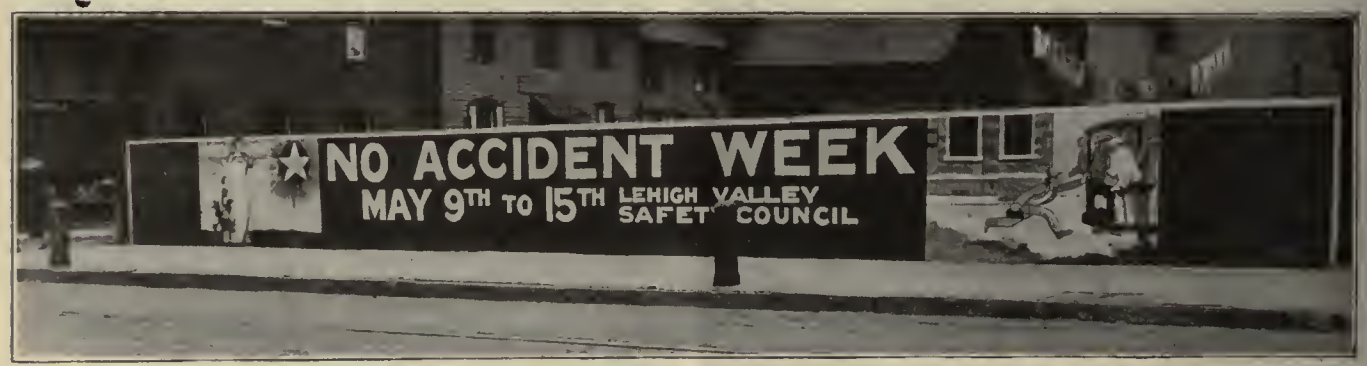
Some Reasons for Success of "No Accident" Week in Allentown







The Lehigh Valley Transit Company helped make the "no accident" week in the Lehigh Valley a success. The illustrations show some of the publicity used in the drive, which was described in the July 10 issue of the ELECTRIC RAILWAY JOURNAL.









Encouraging Thrift

Alert Management of Philadelphia Rapid Transit Shows Men How to Spend Intelligently and Save —Budget Book Furnished with Instructions

THE Philadelphia Rapid Transit Company has been doing some excellent educational work among the employees of the company with reference to the proper division of income into the various items of expenses and saving.

A family budget book is furnished to every employee of the company and, in addition to supplying blanks upon which expenditures may be listed and analyzed, this book gives hints on how to save and typical budget divisions for various wages which might be received by the employees.

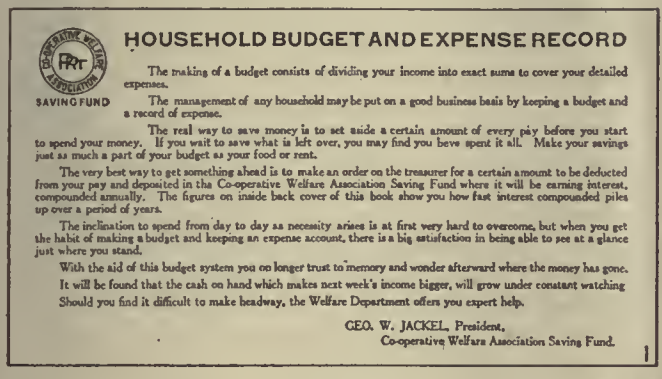
The accompanying illustration shows the details of the budget book with the pages indicated by numbers, 4 and 5 being repeated in sufficient number to make up the entire year.

The principal items in the "typical budget" are based on the actual experience of 11,000 families as reported by the United States Census Bureau and check closely the type of expenditure of the average family of P. R. T. employees.

The budget is based on the average family of five persons, consisting of husband, wife and three children.

Employees of the company have been urged to sign the slip authorizing the co-operative association of the Philadelphia Rapid Transit Company to deduct from $1 to $10 a week from their pay envelopes for saving. The money is placed in the company saving fund. Interest at 5 per cent, compounded annually, is paid. The little table in the back of the booklet shows that a man saving $1 a week for thirty-five years under this plan will have $4,814.07 at the end of that time, and one saving $10 a week would have ten times that amount, which placed at 5 per cent interest would give him $962.80 a year income in interest.

The response to this effort of the management of the company is most gratifying. In July out of 10,000 employees nearly 7,200 were depositors in the co-operative welfare saving fund and their yearly savings amounted to $980,752. This money is invested in car trust certificates of the company.



HOUSEHOLD BUDGET AND EXPENSE RECORD

SAVING FUND

The making of a budget consists of dividing your income into exact sums to cover your detailed expenses.

The management of any household may be put on a good business basis by keeping a budget and a record of expense.

The real way to save money is to set aside a certain amount of every pay before you start to spend your money. If you wait to save what is left over, you may find you have spent it all. Make your savings just as much a part of your budget as your food or rent.

The very best way to get something ahead is to make an order on the treasurer for a certain amount to be deducted from your pay and deposited in the Co-operative Welfare Association Saving Fund where it will be earning interest, compounded annually. The figures on inside back cover of this book show you how fast interest compounded piles up over a period of years.

The inclination to spend from day to day as necessity arises is at first very hard to overcome, but when you get the habit of making a budget and keeping an expense account, there is a big satisfaction in being able to see at a glance just where you stand.

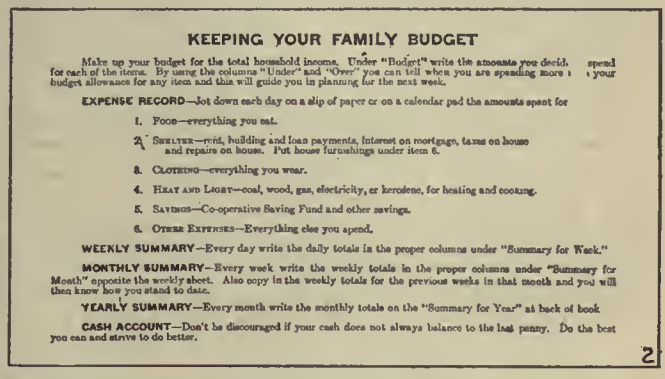
With the aid of this budget system you no longer trust to memory and wonder afterward where the money has gone.

It will be found that the cash on hand which makes next week's income bigger, will grow under constant watching

Should you find it difficult to make headway, the Welfare Department offers you expert help.

CEO. W. JACKEL, President,
Co-operative Welfare Association Saving Fund.

1



KEEPING YOUR FAMILY BUDGET

Make up your budget for the total household income. Under "Budget" write the amounts you decide to spend for each of the items. By using the columns "Under" and "Over" you can tell when you are spending more than your budget allowance for any item and this will guide you in planning for the next week.

EXPENSE RECORD—Jot down each day on a slip of paper or on a calendar pad the amounts spent for

1. Food—everything you eat.
2. Shelter—rent, building and loan payments, interest on mortgage, taxes on house and repairs on house. Put house furnishings under item 6.
3. Clothing—everything you wear.
4. Heat and Light—coal, wood, gas, electricity, or kerosene, for heating and cooking.
5. Savings—Co-operative Saving Fund and other savings.
6. Other Expenses—Everything else you spend.

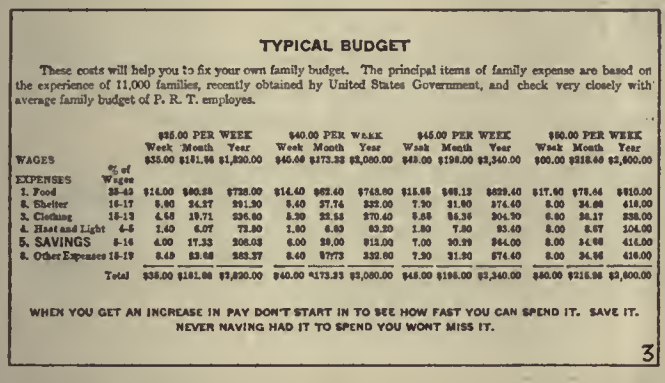
WEEKLY SUMMARY—Every day write the daily totals in the proper columns under "Summary for Week."

MONTHLY SUMMARY—Every week write the weekly totals in the proper columns under "Summary for Month" opposite the weekly sheet. Also copy in the weekly totals for the previous weeks in that month and you will then know how you stand to date.

YEARLY SUMMARY—Every month write the monthly totals on the "Summary for Year" at back of book

CASH ACCOUNT—Don't be discouraged if your cash does not always balance to the last penny. Do the best you can and strive to do better.

2



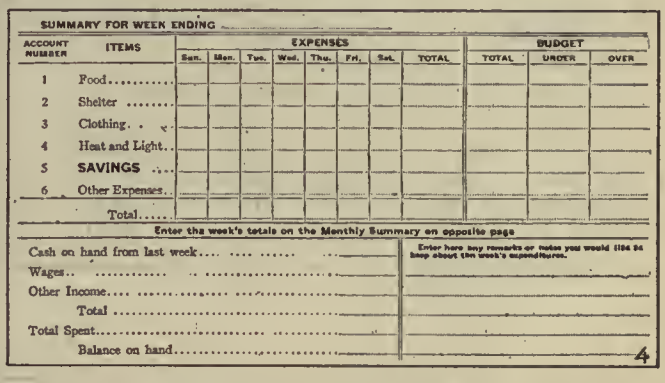
TYPICAL BUDGET

These costs will help you to fix your own family budget. The principal items of family expense are based on the experience of 11,000 families, recently obtained by United States Government, and check very closely with average family budget of P. R. T. employes.

WAGES	% of Wages	$35.00 PER WEEK Week	Month	Year	$40.00 PER WEEK Week	Month	Year	$45.00 PER WEEK Week	Month	Year	$50.00 PER WEEK Week	Month	Year
		$35.00	$151.96	$1,820.00	$40.00	$173.33	$2,080.00	$45.00	$195.00	$2,340.00	$50.00	$216.66	$2,600.00
EXPENSES													
1. Food	38-43	$14.00	$60.23	$728.00	$14.40	$62.40	$748.80	$15.05	$65.13	$829.40	$17.90	$78.64	$910.00
2. Shelter	16-17	5.90	24.27	291.20	6.40	27.74	332.80	7.20	31.20	374.40	8.00	34.66	416.00
3. Clothing	13-13	4.55	19.71	236.60	5.20	22.53	270.40	5.85	25.36	304.20	6.50	28.17	338.00
4. Heat and Light	4-5	1.40	6.07	72.80	1.60	6.93	83.20	1.80	7.80	93.60	2.00	8.67	104.00
5. SAVINGS	8-16	4.00	17.33	208.03	6.00	26.00	312.00	7.00	30.29	364.00	8.00	34.66	416.00
6. Other Expenses	16-19	6.45	23.68	283.37	6.40	27.73	332.80	7.20	31.20	374.40	8.00	34.66	416.00
	Total	$35.00	$151.96	$1,820.00	$40.00	$173.33	$2,080.00	$45.00	$195.00	$2,340.00	$50.00	$216.66	$2,600.00

WHEN YOU GET AN INCREASE IN PAY DON'T START IN TO SEE HOW FAST YOU CAN SPEND IT. SAVE IT. NEVER HAVING HAD IT TO SPEND YOU WON'T MISS IT.

3



SUMMARY FOR WEEK ENDING

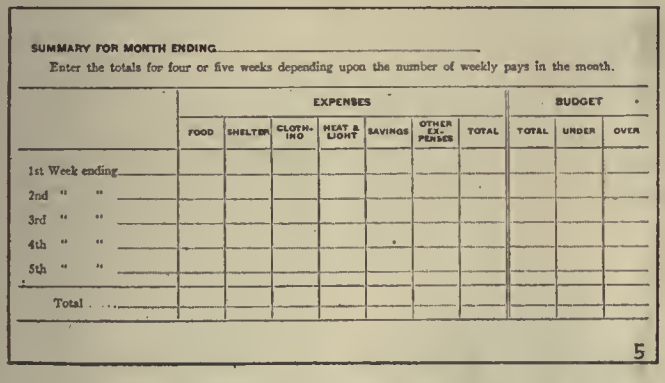
ACCOUNT NUMBER	ITEMS	EXPENSES Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	TOTAL	BUDGET TOTAL	UNDER	OVER
1	Food											
2	Shelter											
3	Clothing											
4	Heat and Light											
5	SAVINGS											
6	Other Expenses											
	Total											

Enter the week's totals on the Monthly Summary on opposite page

Cash on hand from last week
Wages
Other Income
Total
Total Spent
Balance on hand

Enter here any remarks or notes you would like to keep about the week's expenditures.

4

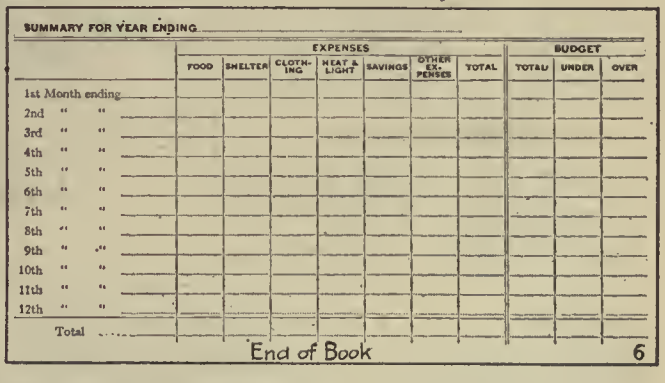


SUMMARY FOR MONTH ENDING

Enter the totals for four or five weeks depending upon the number of weekly pays in the month.

	EXPENSES FOOD	SHELTER	CLOTHING	HEAT & LIGHT	SAVINGS	OTHER EXPENSES	TOTAL	BUDGET TOTAL	UNDER	OVER
1st Week ending										
2nd " "										
3rd " "										
4th " "										
5th " "										
Total										

5



SUMMARY FOR YEAR ENDING

	EXPENSES FOOD	SHELTER	CLOTHING	HEAT & LIGHT	SAVINGS	OTHER EXPENSES	TOTAL	BUDGET TOTAL	UNDER	OVER
1st Month ending										
2nd " "										
3rd " "										
4th " "										
5th " "										
6th " "										
7th " "										
8th " "										
9th " "										
10th " "										
11th " "										
12th " "										
Total										

End of Book

6

PAGES WHICH MAKE UP THE BUDGET BOOK FURNISHED TO ITS EMPLOYEES BY THE PHILADELPHIA RAPID TRANSIT COMPANY. PAGES 4 AND 5 ARE REPEATED ENOUGH TIMES TO MAKE UP THE ENTIRE YEAR

Comparative Power Sources

THE United States Geological Survey has just published the kilowatt-hour output of public utility plants for the first five months of 1920. The figures are based on returns from about 3,000 plants, including central stations, electric railways and certain other plants that contribute to the public supply. The total capacity of the plants reporting is about 90 per cent of the plants listed. The average daily production for the

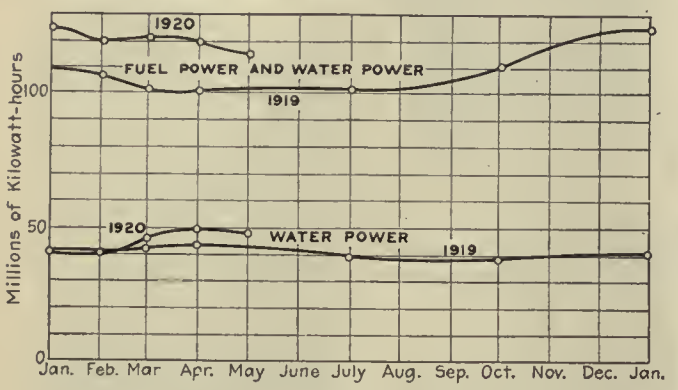


CHART SHOWING AVERAGE DAILY PRODUCTION OF KILOWATT-HOURS BY PUBLIC UTILITY PLANTS IN THE UNITED STATES, 1919 AND 1920

five months was as follows: January, 124,700,000; February, 119,000,000; March, 120,800,000; April, 119,300,000, and May, 114,600,000.

The proportion of monthly totals produced by water power is 33, 33, 38, 41 and 42 per cent respectively.

The mean daily output for 1920 was 119,860,000 kw.-hr. and in 1919 for the corresponding period was 102,680,000, and thus represents an increase of 16.7 per cent. The total fuel consumption in 1920 was: Coal, 15,933,213 short tons; petroleum, 5,292,206 barrels; gas, 7,914,114,000 cu.ft.

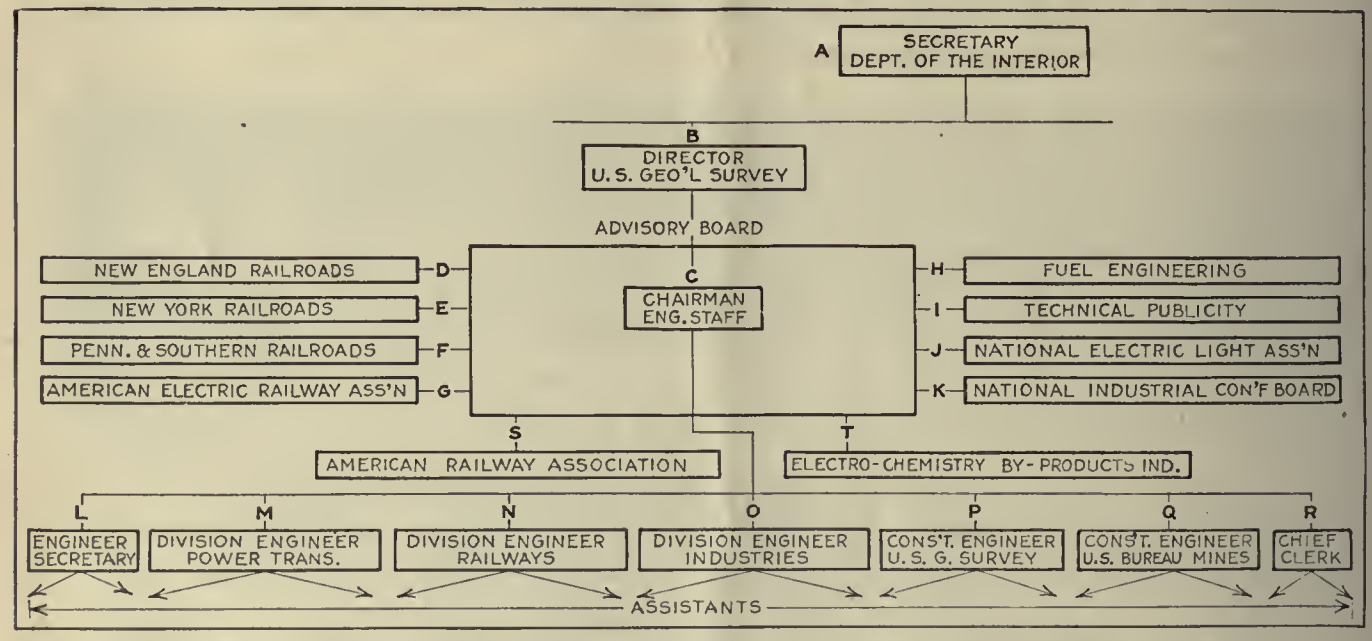
It is interesting to note that Montana, Washington and California produced 40 per cent of the kw.-hours produced by water power during the five months and if New York's water power production is also considered the four states produced 50 per cent of the total energy generated from water powers.

Super-Power Survey Staff Organized

THE chart below shows the organization for the super-power survey between Boston and Washington as announced by W. S. Murray, chairman of the engineering staff. The advisory board consists of all interests directly connected with the super-power survey. The seven engineering assistants will be occupied in collecting and preparing field data.

As the object of the investigation is to allocate the wastes in labor, fuel and other materials used in power production and in transportation in the eastern seaboard district and the design of a regional power system to eliminate these wastes, it was considered advisable to form three divisions, with a chief for each. The divisions are those of (1) power and transmission, (2) railways and (3) industries, and an engineer-secretary collaborates with these division chiefs in the collection and presentation of the field data in the survey report which is due June 30, 1921.

Meetings of the advisory board will be called not less than every two months, when the chairman of the enginering staff will review the progress of the work and the procedure for the next two months will be outlined. It is expected that all field data will be collected by May 1, 1921, so that two months will be available for final preparation of the reports.



ORGANIZATION CHART AND PERSONNEL OF ADVISORY BOARD AND ENGINEERING STAFF FOR SUPER-POWER SURVEY

A. John Barton Payne, Secretary Department Interior.
B. George Otis Smith, Director U. S. Geological Survey.
C. W. S. Murray, consulting engineer, New York, chairman engineering staff.
D. E. G. Buckland, vice-president N. Y., N. H. & H. R.R.
E. A. T. Hardin, vice-president N. Y. C. & H. R. R.R.
F. Appointment not made.
G. John H. Pardee, president A. E. R. A.
H. L. P. Breckenridge, head department mechanical enginering, Yale, chairman advisory board.
I. James H. McGraw, president McGraw-Hill Company.
J. Appointment not made.
K. Magnus W. Alexander, managing director National Industrial Conference Board.
L. Henry Flood, Jr., consulting engineer, Pittsburgh, Pa.
M. L. E. Imlay, consulting engineer, Niagara Falls, N. Y.
N. Cary T. Hutchinson, consulting engineer, New York.
O. Henry W. Butler, consulting engineer, New York.
P. N. C. Grover, chief hydraulic engineer, U. S. Geological Survey.
Q. O. P. Hood, chief mechanical engineer, U. S. Bureau of Mines.
R. J. J. Madigan, chief clerk, U. S. Geological Survey.
S. R. H. Aishton, president American Railway Association.
T. Appointment not made.

Another Argument for State Regulatory Commission

THE *Electrical World* commented editorially last week as follows with reference to the Denver strike:

The destruction of life and property which attended the strike of the Denver Tramway Company employees may be attributed in a measure to the peculiar regulatory system existing in Colorado. In a test case before the Colorado Supreme Court brought by the municipal authorities at Denver it was held that that city and other home-rule cities in Colorado could regulate their public utilities to the exclusion of the state authorities. However, when local regulation became effective in Denver trouble ensued. Lower fares were fixed by ordinance, necessitating a lower wage scale, and naturally a strike resulted. Cars stopped running, business was paralyzed, and newspapers which had theretofore proclaimed home-rule regulation as a victory for the people reversed themselves and urged the recall of the Mayor. Conditions became normal again in Denver only with the restoration of the higher wage scale and the 6-cent fare. The causes of the recent disturbance were not very different from those which precipitated the previous strike, and they call attention anew to the fallacies of home rule and municipal regulation. The moral is very plain and the prayer of every public utility manager should be, "From the machinations of local politicians and municipalities good Lord deliver us!"

There may be, and doubtless are, many other elements which entered into the reasons for the strike, independent of those causes for the subsequent riots, but at the bottom was the inability of the company to make both ends meet on the wholly inadequate fare imposed by the city commission in its "home rule" ecstacy.

Excitation of Alternators

IN ITS July issue the *General Electric Review* summarized the discussion on exciters and exciter systems which was a feature of the A. I. E. E. convention held June 29 to July 2 at White Sulphur Springs. The summary pointed out that the field of exciter systems was covered by a number of papers from manufacturers, from operators and from engineers having to do with the design of new stations. It was noticeable that all of the authors attempting classification of exciter systems divided them into two general classes: First, the common bus system with exciters operating in parallel, and, second, separate exciters or individual exciters for each generator not operating in parallel. This division was independent of the method of drive. The general conclusion reached from the opinions expressed in the papers and brought out in the discussion was that for plants where the speed is not too low or too high to obtain a good design of exciter, the direct-connected individual exciter provides a most reliable form of excitation at the lowest cost. There are some engineers, however, especially those connected with large city central stations, who still prefer the common bus exciter system on account of the fact that a storage battery can be operated on this bus at all times, ready to take up the excitation load in case of exciter trouble. The general opinion, however, and the trend of present practice is toward the individual direct-connected exciter, which has the advantage that its circuit to the generator field is short and simple and not liable to trouble, that its method of drive is exceedingly reliable and efficient and that trouble on the exciter affects only one generator.

Suggestion to Railway Employees

IN ITS latest monthly bulletin the National City Bank of New York suggests to railway employees how they may gain their desired control of or at least a voice in the management of the railways. The same plan, of course, is applicable to electric railways. The bulletin says:

The railroad wage bill after the new wage scale goes into effect will be about $3,600,000,000 per year, and if the employees would set aside 5 per cent they could begin to accumulate an interest in the railroads at the rate of $180,000,000 per year. If this was applied to the purchase of stock rather than bonds they would come quite rapidly into an influential position in the control of the roads, particularly if they concentrated their purchases upon certain systems. The New York Central system has $222,729,300 of stock outstanding, now selling in the market at about $70 per share, or at a valuation of $155,950,510 for the entire stock. A majority would give control and even a respectable minority interest would give representation.

Something New in Selling Transportation

INTRODUCING a new angle to the publicity work of a railway, the Washington Railway & Electric Company of Washington, District of Columbia, has been issuing some very interesting "zoo" posters which it has used in its cars to encourage more passenger traffic to the National Zoological Collection in Rock Creek Park.

Four of these posters are shown in the accompanying illustrations, but it is impossible to do full justice to the artistic quality of these posters in a halftone reprint. The posters are 14 x 21 in. in size and are printed very artistically in colors, mostly yellows and browns.



ZOO POSTERS USED BY THE WASHINGTON (D. C.) RAILWAY & ELECTRIC COMPANY TO ENCOURAGE STREET CAR RIDING TO THE ZOO

Third Rail Shoe Maintenance

Description of Manufacture and Maintenance of Third Rail Shoes and Appurtenances on the Wilkes-Barre & Hazleton Railway

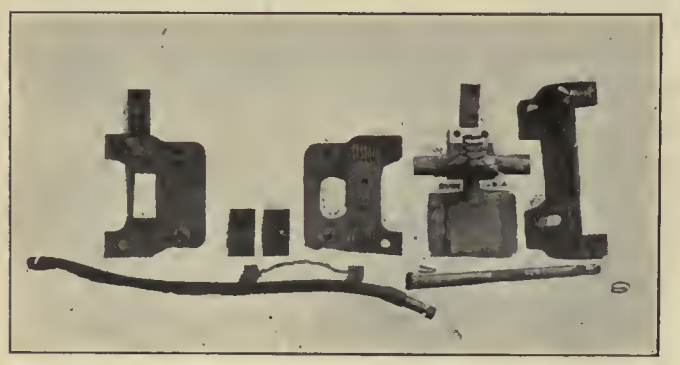
THE Wilkes-Barre & Hazleton Railway operates approximately 30 miles of third rail interurban line between Wilkes-Barre and Hazleton, Pa. For this service the company makes its own third rail shoes and attachments, the designs and details of which are shown



METHOD OF ATTACHING THIRD RAIL SHOE AND LOCATION OF FUSE BOX

in an accompanying illustration, as is also the method of attachment to the car.

In the illustration of the unassembled shoe the piece of equipment at the extreme left is a template for drilling holes in the third rail hanger. This template is made of cast iron and the drillhole guides are lined with tool steel. On top of this template is shown a small block which is inserted in the opening in the template as a guide for drilling the terminal holes. The hanger itself is a casting and is shown in the center of the illustration. The toothed surfaces are made in the shaper and permit vertical adjustment of the bracket and also insure that the bracket will remain in position when bolted. Between the hanger and the hanger template are shown two blocks which are used against the



THIRD RAIL SHOE AND FASTENING MADE BY WILKES-BARRE & HAZLETON RAILWAY

toothed surface to insure that the castings remain parallel in the drill press when the holes are being drilled.

At the extreme right of the illustration is shown the third rail bracket with the toothed surface corresponding to those on the hanger and with oblong holes to permit of vertical adjustment. After the teeth are made in the shaper this casting is placed in the drill press and bored out 1¼ in. and reamed to take hardened bushings 2 in. long for the shaft which holds the third rail shoe in position. This shaft is shown in the right foreground and is 1 in. in diameter with a collar on one end and a cotter pin on the other. A cushioned spring is used on either side of the shoe to take up the end thrust.

The shoe itself is shown between the hanger and the bracket. It is made of gray iron with a chilled face. The shaft hole is made in the lathe by a 1$\frac{5}{32}$-in. diameter four-lip high speed drill. The neck of the shoe is made slender so that in case of obstruction on the third rail the shoe will break at this point and thus leave no part of the shoe to interfere with the third rail or appurtenances. The shoe is planed off to accommodate the shunt terminal, and two holes are drilled by means of the small template shown standing on top of the shoe. The shoe is held down against the third rail by the $\frac{7}{8}$-in. diameter wire tension spring shown in position on the shoe. This is in addition to the weight of the shoe, which is 26 lb.

The collector cable shown in the foreground has special terminals, one clamping to the third rail frame and the other fitting the GE-M.A.-10-A fuse box.

As shown in the second illustration, the fuse box is placed on a special bracket made of ¼-in. x 2-in. iron, so that it is at a pitch of approximately 45 deg. to the horizontal. This permits water to drain from the top of the box and keeps it from warping. A very good life is said to be obtained from this third rail shoe. The castings are made in a local foundry at a reasonable expense.

New Anti-Rust Compound

THE first public demonstration of "Stazon," an invention of the Conversion Products Corporation, of New York City, was made at the Lawyers' Club on July 19. This is a new anti-rust compound that withstands intense heat. It is intended for use on tools or finished machinery parts which cannot be painted or otherwise protected from rust during transit or while being stored for use. The present practice of manufacturers and other users is to coat the finished parts with vaseline or some other petroleum compound. The trouble now experienced from these compounds is due to their melting when temperatures from 90 deg. upward are reached, as is quite common in warehouses or other storage places during summer months. The melting of the grease leaves the parts unprotected and they soon rust. The principal feature of "Stazon" is that it will not melt until a temperature of approximately 210 deg. is reached.

This new compound contains no metallic element in its composition and possesses the ordinary lubricating and insulating qualities of petroleum jelly. There may be a field for its use among the electric railways for the lubrication of parts such as gears, where it is desirable to have the grease remain on rotating parts and also for the lubrication of valves which are subjected to high temperatures and where the present greases melt and run out.

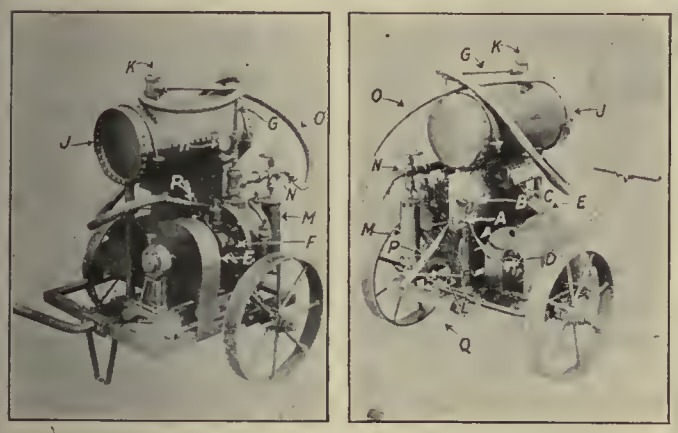
The committee on public service securities of the Investment Bankers' Association of America, O. B. Willcox, chairman, is sending out to all members of the association a pamphlet, entitled "Appraisals and Rate Making," by Cecil F. Elmes of Sanderson & Porter.

Light-Weight Rail Preheater

New Outfit Is Particularly Adapted to Heating One Joint at a Time as Is Necessary for Scattered Work

A NEW light-weight preheater for thermit rail welding has been recently developed by the Metal & Thermit Corporation, New York, N. Y. Until lately preheating for this process has always been accomplished by means of an electrically driven blower mounted with a gasoline tank on a three-wheeled truck and capable of heating four joints at once. This has given very good results where quantity production was desired. There are many cases, however, where it is only possible to heat one joint at a time, and in such cases this small light-weight machine will be found to be much more economical, because it can easily be moved from one joint to another and because two or three of them can be supplied at the cost of one of the larger preheaters. Two or three small preheaters will take care of the same amount of work as one large preheater.

Another feature embodied in the small preheater is a vaporizing apparatus, by the use of which kerosene may be used instead of the more expensive gasoline required by the large preheater. In addition, by using



NEW DESIGN OF SMALL RAIL PREHEATER

A—Trolley and ground connector. *B*—Snap switch for starting and stopping the motor. *C*—Fuse box with 6-amp. fuse. *D*—¾-hp. 220-volt compound wound motor. *E*—Guard for drive. *F*—Rotary pressure blower. *G*—By-pass air pipe for air pressure in tank. *H*—Pressure gage. *J*—Fuel tank. *K*—Filling plug. *L*—Fuel feed pipe. *M*—Combination vaporizer and external resistance heater coil. *N*—Needle valve for mixing. *O*—Fuel and air hose. *P*—Preheating nozzle. *Q*—Leg to prevent backward overturning of machine.

kerosene the advantage of its greater heating value is gained.

The preheater is of the single-burner type and is equipped with a rotary blower driven by a 220-volt motor connected in series with an 85-ohm external resistance coil. This arrangement, in addition to permitting the use of the low-voltage motor, also permits the use of kerosene oil for fuel, as the resistance coil is wound on a porcelain tube which surrounds the oil pipe leading to the burner and the heat developed in this resistance is sufficient to convert the oil into a perfect vapor. The oil is stored in an overhead 6-gal. tank and is fed through a looped pipe connected to a needle valve which controls the flow of oil from the tank. The resistance coil is located on a vertical leg of this loop directly under the needle valve and the oil is completely vaporized before entering the needle valve. The object of the loop in the kerosene oil pipe line from the tank to the needle valve is to eliminate the possibility of oil vapor getting into the tank.

The use of a shut-off valve was purposely omitted in the oil line in order to avoid creating an extremely high pressure in the line in case the operator should have both the needle valve and shut-off valve closed while the current was flowing through the resistance. As the machine is constructed at present, there can, at no time, be a pressure within the tank greater than that supplied by the blower. For the same reason no valve was put in the by-pass air pipe connected to the top of the tank.

This machine, being single burner only, is not equipped with and does not require any air adjustment valve, as the rotary blower furnishes a uniform and constant supply of air. The only adjustment, therefore, is at the needle valve, which should be regulated to obtain proper combustion at the burner. More oil will be required at the start than after the burner has been going for some time. The regulation of this valve will depend also on the voltage, to a considerable extent, as this will affect the speed of the motor and the air pressure.

At 550 volts the full-load current for this machine is 3.2 amp., and the machine has been so designed that even at considerably lower voltages it will deliver sufficient air for all purposes. This is important, as in many cases, particularly in repairing old track, the line voltage will drop so low, due to defective bonding and broken joints, that it is difficult to obtain sufficient air properly to preheat at all.

Making Cement Sack Cleaning a Better Job*

CEMENT sacks have to be cleaned, sorted, counted and bundled for return. This forms an odd job at the track store yard of nearly every electric railway company that nobody wants to do. It has been made a more pleasant job, the cost has been reduced, more cement recovered and a great deal of labor saved by the scheme which has been adopted at the store yard warehouse of the United Railways of St. Louis.

A No. 5 Buffalo blower is installed overhead with the intake pipe extending down to a point about waist high. The discharge from the blower is piped a short distance along the wall, where it connects to a cyclone separator. A cement sack is put over the mouth of the intake pipe. The suction draws the bag up into the pipe and turns it inside out. The workman then pulls it out and again puts it over the end of the intake, which turns the sack the other way out and sucks the cement from the opposite side. This process leaves the sacks cleaner than it is possible to get them by hand. The cement recovered is deposited in a sack attached to the bottom of the cyclone. By this means from one and one-half to two sacks of cement are recovered per 1,000 sacks cleaned. Two men can clean 2,000 sacks a day, besides sorting, counting and bundling them. The cement recovered makes a credit to the cost of handling of about $2.50 a day. The use of this machine makes the bag cleaning not a particularly undesirable job, and furthermore largely overcomes the spreading of cement dust over everything in the warehouse. "The machine would be worth while if it didn't do any more than make the job fit for a white man to work at," was the way C. L. Hawkins, engineer maintenance of way, expressed the value of the blower system of cleaning.

*Another article describing cement sack cleaning at Cleveland appeared in the issue of this paper for October 9, 1915, page 773.

How an Englishman Appraises American Railway Practice

C. J. SPENCER, manager Metropolitan Electric, London United and South Metropolitan Tramways Companies, gave an interesting paper on American electric railway conditions before the annual congress of the Tramways and Light Railways Association held in London in July. Mr. Spencer spent six weeks in America recently, and, as the chairman said, "perhaps, like many other people who had spent a short time over there, he knew far more about the conditions than Americans themselves." He stated that the main problem facing the American railway industry was financial and that this is being met in two ways, viz., increasing fares and the introduction of improved operating methods.

Mr. Spencer states that the cost of operating a railway system is now about equal in England and the United States, but that the fare charged in America is very much higher than they have ever dared suggest in England.

He believes that the necessity for the high fare in America is due to an absence of short-haul traffic and the short-haul riding habit has not been properly cultivated in America. In this connection he points out that the receipts and costs of operation per car mile are about the same on both sides of the Atlantic but the British car shows a much larger number of passengers carried per car mile. He intimated that a lower minimum fare and the permission to smoke would help the short-haul traffic.

He remarks on the failure of the double-deck car in America and suggests research for English railways to determine the most suitable vehicle for the future. The average speed is the same in each country, and Mr. Spencer thinks the greatest future economy will be found in increasing schedule speeds. He further states that America has been very progressive in rolling stock design and has equipment and conveniences such as air brakes, control doors, etc., far in advance of any found in England. He commends the safety car and the fare collecting systems and was startled to find that American railway labor was paid only at the same rate as English labor since the war.

Mr. Spencer spoke of the efficiency engineer and the use of modern labor saving machinery and said they offered opportunity for profitable study. In conclusion, he said that American systems showed that many improvements could be made in English railway practice, but that he noticed no differences in fundamental transportation methods.

The American Railway Engineering Association has become a member society of Engineering Council and will be represented by its president, Harry R. Safford. Mr. Safford is assistant to President Hale Holden of the Chicago, Burlington & Quincy Railroad and was formerly chief engineer of the Grand Trunk Railway. The societies now represented in Engineering Council have an aggregate membership of 45,000.

The fortieth anniversary of the piercing of the Gotthard tunnel between Switzerland and Italy was celebrated recently. This important artery of travel is now doubly interesting because it is in process of electrification.

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

The Electric Railways Commission Report

THE American Association has arranged for the printing of an edition of the report of the Federal Electric Railways Commission, released for publication on Aug. 24 and reprinted in full in this issue of the ELECTRIC RAILWAY JOURNAL. The printing was done by the Government Printing Office, Washington, D. C.

The association is also arranging for the printing of the testimony taken by the commission, which will occupy three volumes.

1917-1919 Proceedings Ready for Distribution

SECRETARY Burritt has announced the publication of the volumes of the proceedings for the several associations, each volume covering the 1917-1919 period. The full set sells for $12.50 and individual volumes as follows: Accountants' Association $2.50, American Association $3, T. & T. Association $3, Engineering Association $4, Claims Association $2.50.

Engineering Association Nominations

THE nominating committee of the Engineering Association, consisting of F. R. Phillips, J. H. Hanna, C. R. Harte, J. H. Libbey and N. B. Trist, has presented the following slate for consideration at the October convention: For president, W. G. Gove, superintendent of equipment Brooklyn Rapid Transit System, Brooklyn, N. Y.; for first vice-president, C. L. Cadle, chief engineer New York State Railways, Rochester, N. Y.; for second vice-president, C. S. Kimball, engineer way and structures Washington Railway & Electric Company, Washington, D. C.; for third vice-president, C. F. Bedwell, assistant engineer Public Service Railway, Newark, N. J.; for secretary-treasurer, E. B. Burritt, New York, N. Y.; for members executive committee, H. A. Johnson, organization engineer Metropolitan West Side Elevated Railway, Chicago, Ill.; L. C. Datz, engineer American Cities Company, Birmingham, Ala.; E. H. Scofield, engineer of power Minneapolis Street Railway, Minneapolis, Minn.; A. B. Stitzer, chief engineer Republic Engineers, Inc., New York, N. Y.

Henry L. Doherty was fifty years old on May 15, 1920, and in honor of this event the Doherty Men's Fraternity, through its chapters in the various properties of the Doherty organization, planted trees as a lasting and appropriate tribute to its chief. An account of the ceremonies in the different cities in which these observances took place are collected in a pamphlet recently issued by the fraternity and the hope is expressed that through these trees succeeding generations of the organization may have tangible evidence of the esteem in which the first generation of Doherty men held their chief. Incidentally, it might be said that the Doherty Men's Fraternity now includes a membership of 5,794, with representatives in twenty states. The membership is still restricted to men employed exclusively in the service of the Doherty enterprises.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

$195,016 Divided

Profit-Sharing Plan Has Been Instituted by the Virginia Railway & Power Company

Employees of the Virginia Railway & Power Company in Richmond and in all other divisions of the company will receive an average of 6 per cent on their present wages by the institution of the company's new "profit-sharing" plan. The announcement concerning the basis for the wage increase follows:

COMPANY'S STATEMENT

Desiring to deal both justly and liberally with its employees, the company hereby makes effective from Aug. 1, 1920, until further notice, the following profit-sharing plan through an increase in wages, based upon a division of the net profits for the year ended June 30, 1920, after paying from the gross earnings: Operating expenses, interest on bonds and other debts, sinking fund charges and taxes, discount on bonds and uncollectable accounts, and reserve depreciation (6 per cent on gross revenue), 6 per cent on preferred stock, and 3 per cent on common stock.

The amount to be made the basis for increase of wages on a division (on a fifty-fifty basis) between the company and all classified employees, superintendents and below, who have been in the service for the last six months, is $195,016. This will justify an increase of 6 per cent. Therefore, 6 per cent will be added each pay day to the wages or salary of each classified employee who has been in the service six months at the time each pay roll is made up, effective from Aug. 1, 1920, in the following six months.

For each six months' period hereafter ending Dec. 31 and June 30, there will be an ascertainment of the profits to be made the basis of the wages for the following period of six months. The statements of the company will be subject to verification by a certified public accountant, if so desired. Through the profit-sharing plan hereby made effective employees of the company are made "partners," and it is the sincere hope and belief of the management that teamwork will win just reward for all concerned and insure to the public the high class of service it deserves.

Thomas S. Wheelwright, president of the Virginia Railway & Power Company, issued the following statement:

The profit-sharing plan at present announced by the company is based on its present method of accounting, which has been in vogue for the last ten years. It has been the policy of the company to set aside 6 per cent of its gross revenue for depreciation or renewal reserve. This was according to the best practice at the time the policy was adopted.

OPERATING EXPENSES HAVE DOUBLED

However, in this period, operating expenses have been more than doubled, whereas rates and charges upon which revenue is based, have remained practically stationary, and hence the 6 per cent on gross earnings for depreciation or renewal reserve, as shown on the books of the company, has become increasingly inadequate. The present accepted standard of depreciation reserve is based upon 6 per cent of the value of the property used in operation, and if this method of setting aside depreciation or renewal reserve was adopted, instead of showing a surplus a large deficit would be the result.

Lately the company had all of its properties inventoried and appraised and is now seeking to have its franchises so revised as to insure an adequate return on the capital at present properly invested in the business, as well as to set aside a suitable amount for depreciation or renewal reserve so as to keep all of its equipment up to the highest standard of practical efficiency.

It has been the policy of the company in the past to meet, as far as it could possibly do so, the increased cost of living by advancing the compensation of its employees, and realizing their situation under present conditions the company has deemed it just to continue this policy based upon a profit-sharing plan. This is the best possible evidence to its employees of the sincere desire of the company to act fairly by them.

As to the dividends on its stocks: In common with public utilities all over the country, our company has been unable for the last six years to sell any of the bonds issued into its treasury for financing the continued necessary capital expenditures required to keep the service going. Hence these expenditures have had to be financed out of the earnings and dividends on the stocks have necessarily had to be withheld. However, we expect relief in this situation by a revision of the franchises and rates for service based on the capital invested in the business in the light of the recent valuation of the properties.

It is our definite belief and expectation that when the necessary changes are made in the franchises governing rates and charges, that this will meet all reasonable expectations of the investor for a return on the capital, of the employee for his services rendered to the public, and of our patrons who will be insured a morale expressed in team-work which will greatly benefit the service.

Eastern Massachusetts Arbitration Concluded

The hearing before the board of arbitration in the Eastern Massachusetts Street Railway wage controversy was concluded on Aug. 9.

At the closing session Henry F. Hurlburt, special counsel to the trustees of the company said:

It is significant that the men have declined to produce any evidence to show that they cannot get along on their present wages. The road has a fare schedule fully as high, if not higher, than any other road in this part of the country, and the fares cannot be raised to produce increased revenue with which to pay the men, because the public simply will not pay the increase. Regardless of what has been presented here in behalf of the men, I maintain that the old law of supply and demand should hold sway.

These men have their services to sell; that is their commodity in the market. If they are now receiving a living wage, as I contend they are, and there is a plentiful supply of labor, as the company officials have shown there is, then, under the law of supply and demand, no reason in the world why the company should pay its men higher wages.

Discussing the situation from the standpoint of the men, Mr. Vahey said:

This board is bound to award the men a living wage, regardless of its effect upon the company. The position of the company that the men should work for 3 cents an hour less in those places where it did not earn the cost of service illustrates the absolute lack of regard for the men by the trustees. If this was carried out, it would mean a contribution of $84 per man, against the contribution of $2 per inhabitant by towns which contributed toward the deficit of the road.

Arguing in support of the demand of the men for eight hours' work in ten, Mr. Vahey declared that the eight-hour day is inevitable. He also brought out the fact that the road has shut down 16 per cent of its trackage, and has installed 200 one-man cars out of a total of 900 cars on the system.

New Orleans Still Puzzled

Settlement of Wage Matter Brings Up Service-at-Cost, New Fare and Credit Matters

Three steps are considered essential by Receiver O'Keefe of the New Orleans Railway & Light Company, New Orleans, La., to give the city proper electric railway and power service. They are service-at-cost for the railway, the expenditure of $16,000,000 in the next five years for extensions and improvements, and a return on the company's investment sufficient to attract additional capital.

RAILWAY VALUE $29,191,210

Prof. Albert S. Richey has suggested an automatically adjustable fare under service-at-cost, with a net return of 7 or 8 per cent on an appraised value of $55,000,000. This is asked as a fair reward for investors. In giving the total valuation of the property of the company at $55,566,855, the different departments were valued as follows: railway, $29,191,210; gas, $11,218,548; electric, $15,087,097.

With reference to the expenditure of $16,000,000 in the next five years, it was stated that $12,000,000 in new capital was needed and that $4,000,000 must be spent to maintain and repair equipment already owned by the company. The money would probably be distributed from 1920 to 1925 as follows: power, $4,576,000; equipment, $5,576,000; track, $4,576,340; and distribution, $2,009,600. Since 1918 only about $1,000,000 has been spent on additions and betterments. The normal program is several million dollars behind. The sum of $2,000,000 to $3,000,000 should be expended at once, and thereafter, $1,500,000 a year.

An 8-cent fare has been requested by the receiver. This may not furnish an adequate return, but is expected to result in a restoration of credit sufficient to enable the properties to be reorganized and thereby provide necessary new capital for additions, extensions and betterments. No dividends have been paid on the common stock since 1916 and none on the preferred since 1917. The interest on the bonds and debentures has not been paid since January, 1919.

Much discussion has ensued relative to the wages that should be paid the employees of the railway. If he is granted a fare of 8 cents, the receiver has offered a wage scale for platform men of 46 cents an hour for the first year, 49 cents for the second year, and 52 cents for the third year and thereafter. The present rates are 38, 40 and 42 cents an hour.

Wage Increase Disallowed in Omaha

State Railway Commission Decides There Is No Need for Increase—Service Attractive Under Present Scale

The State Railway Commission of Nebraska has denied the application of the trainmen of the Omaha & Council Bluffs Street Railway for an increase of 13 cents an hour in wages. The present scale paid by the company is 53 to 57 cents an hour. The commission held that the increase in wages would necessitate an increase in fare and would take additional toll from other working men, many of whom do not earn as much as the trainmen. The commission also found the present wages sufficient to attract enough men to maintain efficient service, as evidenced by an average of ten applications received every day by the company. It was further held that an employee of the company working twenty-six days a month at reasonable hours is able to earn $150 a month. The order of the commission says that "the evidence does not sustain the complaint that the wages are inadequate and it should be dismissed."

THE men brought their case to the State Railway Commission, holding a strike vote in abeyance. During a hearing which was held in Omaha, they endeavored to withdraw when the commission declined to go into the high cost of living as an element of the case. The men have not indicated whether they will accept the order of the commission. They are holding executive meetings.

The following are the allegations of the pleadings, according to the text of the commission's finding:

The complainants allege that the wages paid in the various divisions and classes of employment are not sufficient to permit the employees to maintain themselves in keeping with the nature of their employment and are not sufficient to enable the company to keep an adequate number of competent conductors and motormen, and that they have taken a strike vote and intend to strike if adequate relief is not provided in wages and conditions. An increase of 13 cents an hour is asked. This would make the pay of all motormen and conductors, 66 cents for the first three months, 68 cents for the next nine months, and 70 cents thereafter, with a corresponding increase over present wages for all other classes of employees.

The defendant alleges that the State Railway Commission has no power to fix or determine a scale of wages to be paid by defendant to its employees; that the right of contract is guaranteed by the constitution of the United States and by the constitution and laws of the state of Nebraska; and that no governmental authority has the right to interfere in the fixing of terms between defendant and its servants. After extended argument on the plea, it was overruled.

Company's Side Stated

The defendant then filed its answer in which it is denied that the wages paid are insufficient, and denied there is any impairment of the service. The defendant alleges that there would be no impairment of the service, even temporarily, in the event that a strike should occur unless complainants use force to produce such impairment. It also alleges upon information and belief that the strike vote referred to in the complaint does not represent the will of the employees of the company and that a large proportion of them wished to continue their service at the existing scale of wages and do not intend to strike. It denies that the scale of wages is inadequate to secure the services of a sufficient number of men capable of operating the system, and alleges generally that the scale of wages is fair and reasonable. It sets forth that there have been numerous increases of wages during the last six years; that the company is operating at a loss and that it is unable to pay larger wages; the complainants having voted to strike and intending to do so unless their demands are complied with, are not acting in good faith and therefore have no standing before the Commission. It alleges generally that the service rendered by the company is efficient and that it will, if it receives proper protection of law, continue to furnish such service to the public.

The reply denies that the strike vote does not represent the will of the employees; denies that a large proportion of them are willing to continue in service at the existing scale of wages; and particularly denies that at any stage of the controversy the complainants, or anyone in their behalf, have interfered or threatened forcibly to interfere with the service of the company.

Prior to entering upon the hearing the commission made the following statement for the record:

We hold that our jurisdiction extends only to the maintenance and continuance of adequate service by the Omaha & Council Bluffs Street Railway within the city of Omaha and its suburbs; that to that end we can, after proper inquiry, establish a general schedule of wages sufficient, in our opinion, to attract and secure the necessary number of men to operate the system. In fixing a general schedule we shall go only as far as is required to determine what amount will be necessary to insure service. Collateral economic questions will not be considered. The ability of the company to pay any schedule we may determine is of necessity a prime factor, and for that reason we shall receive evidence with reference to the present revenues and operating expenses and general financial condition of defendant; so that we may, if found necessary, make emergency rates to cover the new obligation imposed. Such a showing need not involve a valuation of the property, as that might take so long as to defeat the purpose of the rate increase in the event such increase is required.

Another excerpt is taken from the commission's finding:

The commission struck out all references in the pleadings to the cost of living, and all references to the fixing of a general wage standard. Throughout the hearing the complainants endeavored to introduce evidence as to rents, cost of food, cost of clothing, etc. The commission consistently refused to go into such an investigation. It conceived its jurisdiction to be limited to fixing a scale of wages that would attract an adequate number of capable employees to enable the defendant to carry on its service, and further than that it refused to go. There is some reference to working conditions but not much stress is laid on that phase.

The controversy centers on the issue as to wages and principally on the wages of motormen and conductors. The controversy seems to have arisen because at the time of the increase in fares granted by this commission to the defendant on Aug. 1, 1919, the employees considered they did not receive as much increase in wages as they were entitled to. The company urged that it was still operating at a loss, but some of the employees seemed to doubt the accuracy of the figures presented by the defendant and insisted upon submitting their differences to arbitration. It was finally suggested by the men, and agreed to by the defendant that the controversy be submitted to this commission as a board of arbitration. The commission, of course, declined to act in that capacity in a matter in which it was likely to be called upon officially. Therefore the complaint was filed.

Another statement by the commission reads:

One object of the people in establishing the Railway Commission was to protect the public service against interruption. When information is brought in the form of a complaint, it is not material who files the complaint or what his attitude may be. If the commission has information that the public service is threatened with suspension, it immediately becomes its duty to protect it. It must be presumed that the complaint was filed in good faith and that if, after a full hearing, the employees are not satisfied with the decision of the commission, they will not strike but will pursue their right of appeal.

The commission offered the following comment on the duties of common carriers and their employees:

It is the duty of the Omaha & Council Bluffs Street Railway to render service as a carrier to the public of the city of Omaha. Can the employees of the company who have undertaken equally with the stockholders of the company to serve the people of that city, lawfully agree to strike—to leave en masse and thus paralyze the industries and social organization of a great center because they are not receiving what they consider a suitable wage?

The state has provided a tribunal for the adjustment of wage difficulties and there is no occasion for the settlement of such difficulties other than by resort to it. In short, there is no place for a strike in the public economy of a state that has provided for regulation.

This view is wholly consistent with the right of employees to leave the company as individuals. The company passes upon the merits of each individual as he is taken into the service. The employer can not secure its employees collectively, but must secure them individually, assigning them to the respective departments to which they are best adapted. It is no great loss to the company and does not disturb its working power when an individual drops out of the service. Adjustments are readily made and there is no appreciable injury. But when the employees form themselves into an organization and quit work as a unit, the public service is totally disrupted regardless of the high standard of efficiency prior to the strike and the public suffers until the company has had time to reorganize and develop a new working body and gradually build up the service anew.

That the employees of the company in this instance have invoked the jurisdiction of this commission to settle the controversy between them and the company is a recognition of the fact that the people have the power to adjust these matters and that they have created a tribunal for that purpose, and we have every confidence that the decision of the commission will be received as a final determination by all parties except so far as they may desire to exercise their right of appeal.

A digest of the conclusions of the commission follows:

The company employs 1278, not including the accounting and clerical force. This represents an increase of 13 per cent in the operating force during the last year.

In general the service of the company is at a high standard. It has on its payroll a larger number of men than ever before and at present there is no lack of men.

The company is now averaging ten applicants a day for positions as trainmen received without advertising and without special efforts. It is daily turning away many applicants who have the required qualifications.

The trainmen are now receiving 53 to 57 cents an hour, according to length of service.

The evidence shows that 720 men worked twenty-five days or more during May, 1920. Of these, 652 earned, on the average, $155 for the month, the highest being $204. The remaining sixty-eight of the 720 worked twenty-five days or more, but a lesser number of hours per day, and received on the average $125. The average wages earned by the 720 men for the month were $152. The average earned by all trainmen for the month of May, regardless of the number of days or hours, was $140.

The wages of trainmen have been more than doubled from Aug. 1, 1914; to be exact, they have increased 114.98 per cent.

It was necessary to compare the wages of carmen with wages paid to other employees in Omaha, whose occupations are comparable with the employees of the railway. As the result of an independent survey of wage conditions in Omaha the commission notes the following:

Teamsters, $20 to $28 per week; standard wage about $27.

Truckman, $23 to $31 a week; drivers of large trucks with considerable responsibility and part time on Sunday, $150 a month.

Truck drivers for ice companies earn $110 to $120 a month. Route ice drivers are paid $125 a month.

Employees of the fire department are paid $100 per month for first year; $110 second year; $140 a month thereafter.

Policemen are paid $125 a month for first year; $135, next six months; $140 a month thereafter.

Men in charge of gasoline and oil stations, $90 to $110.

Bank clerks, $80 to $140 a month.

We cannot, therefore, say that the wage paid by the defendant company is not sufficient to attract suitable men and the fact that its lists are now full is evidence that they are coming in sufficient numbers.

It also follows that if the pay of the railway employees is to be raised, the operating expenses will be correspondingly increased, all of which in turn must be met by an increased fare. To give increased wages to the railway employees would be to subtract that much from the income of those engaged in other lines of labor in the city of Omaha, and who are now getting, on the average, a smaller wage than the employees of this company.

The company should be allowed by the commission to charge the public only such a rate of fare as will enable it to furnish proper service. This, of course, includes a wage that will keep in its employ an adequate number of men sufficiently qualified to carry on the work. When the men receive the wage that is offered generally for like service and the company has properly maintained its facilities, set aside sufficient reserves and paid a fair return to its stockholders, the surplus, if any, should and must stand for the rate-paying public. The commission has no right to allow this surplus to be encroached upon either by the stockholders or by its employees.

Commissioner Browne dissented from the conclusions of the majority by holding that a section of the Clayton Anti-Trust act and a decision of the Nebraska Supreme Court "specifically permitted employees 'singly or in concert' to quit employment and 'recommending, advising or persuading others by peaceful means to do so.'"

Rehearing Asked in St. Louis Wage Case

The State Public Service Commission is asked to disregard the inability of the United Railways, St. Louis, Mo., to increase wages and to ignore the fact that such increases might require an advance in fare, in a motion for rehearing of the United Railways wage arbitration case, filed in Jefferson City on Aug. 11 by Edward W. Foristel, attorney for the employees of the railway. The commission in July granted the employees an increase of 5 cents an hour. They had requested an increase of 20 to 25 cents an hour over the prevailing scale of 50 to 60 cents for motormen and conductors. It was stated recently that because of the wage increase the company might ask for a higher fare. Six grounds for rehearing are set out in the motion, as follows:

1. The award is based on matter outside the facts submitted in the stipulations filed by parties to the controversy, in that the award stated that "wages have about reached the limit the traffic will bear or that the public should be asked to pay."
2. The only matter submitted was the fixing of a reasonable rate of pay and reasonable working conditions, regardless of the company's ability to pay, and the rate of street car fare.
3. The finding was against the weight of testimony adduced at the hearing and the pay allowed is less than the decent living wage of American workmen.
4. All evidence introduced as to increased living costs shows that the increase in cost of necessaries amounted to 22 per cent in 1920 and the increase in rents to 30 per cent and that the pay advance was less than 10 per cent.
5. The award was based on the assumption that if the demands had been allowed, a uniform car fare of 8½ cents would have been required.
6. The commission erred in basing its findings on those facts and therefore it should disregard the ability of the company to pay and whether a higher fare would be required.

Toledo Will Vote Again

Service-at-Cost and Municipal Ownership Measures, Recently Defeated in Referendum, Repassed by Council

Three propositions aiming at a solution of railway troubles in Toledo, Ohio, will confront electors when they go to the polls at the general election on Nov. 2. The City Council on Aug. 23 passed both the cost-of-service ordinance and the twin municipal ownership ordinances which were decisively defeated at the primary election on Aug. 10. An attempt was made to put the Milner cost-of-service plan up alone at the coming election, but the municipal ownership enthusiasts backed by the Socialists in Council formed a deadlock and it was necessary to pass both plans in order to have any chance at the cost-of-service plan.

MAYOR CORNELL SCHREIBER also urged Council to resubmit the bonding propositions. The two municipal ownership ordinances call for $7,000,000 in general credit bonds for some unknown kind of transportation system, but with definite provision for added tax levy to pay the interest and sinking fund requirements of the bonds.

Proposal a Modern One

The service-at-cost plans is one of the most modern and complete of its kind. It has a rate-making valuation of $8,000,000 which was accepted by the Toledo Railways & Light Company, in a written agreement delivered to the city on Aug. 21.

The agreement was executed by the Toledo Railways & Light Company, and a copy was delivered to the newly incorporated Community Traction Company, provided for in the cost-of-service ordinance, and a third copy to the city. The Rail-Light assigns upon the passage of the ordinance all its franchise rights and railway property to the Community Traction Company.

The Community Traction Company is capitalized at $10,000,000 of which amount $8,000,000 is represented in bonds and is the accepted valuation of the present railway property. These bonds will bear 6 per cent interest. The other $2,000,000 of capitalization represents the funds Henry L. Doherty agrees to bring into Toledo for extensions and a cross town line. It will be represented by an 8 per cent preferred stock. Matters are so worked out that the city would own the lines at the end of twenty-five years.

Defeat Again Likely

It is conceded by most municipal ownership advocates that the unchanged twins will be defeated by a greater majority when they come to the people for the second time. The fate of the Milner ordinance is doubtful. If both should be passed the Mayor and legal authorities have declared that the cost-of-service plan would be put into immediate operation and the bonds for municipal ownership held up indefinitely.

Upon the organization of the Community Traction Company, officers were chosen. They are practically the same as those of the present Toledo Railways & Light Company. Frank R. Coates is president, Morton Seeley, vice-president, S. D. Carr, treasurer, Henry Ledbetter, secretary, and A. C. VanDriesen, assistant secretary.

The company will only begin to function if the cost-of-service is approved by the people. A transportation commissioner, selected by a city board of management, will have supervision of management of the railways and all accounting.

On account of a conflict in state and city constitutional requirements the three measures will have to be repassed by Council at its session on Sept. 13.

Barratry Act Constitutional

U. S. Supreme Court Passes on Texas Statute Affecting Laymen—Law's Chief Features Reviewed

In 1917 the Texas legislature amended the State barratry statute by making it apply to laymen as well as attorneys-at-law. The statute as redrafted is a very comprehensive one and is aimed to prevent unnecessary litigation, the penalty for its violation being a fine of $500, with possible imprisonment for three months.

The history of the act can be summed up briefly. In 1916 the San Antonio Traction Company brought suit against a layman who had been active in soliciting claims against it, alleging that he was engaged in the business of soliciting and stirring up claims and suits for unliquidated damages for personal injuries against the company, that he maintained an office and had a large number of employees for this purpose, with agents that kept a lookout for accidents and hunted up prospective claimants and urged them to make contracts with him, and caused many of them to enter into such contracts, assigning him one-third or one-half of the amount of their cause of action. The company asked for an injunction to restrain him from engaging in this business, but the injunction, on appeal, was refused because the existing act did not cover laymen.

The legislature then promptly enacted an amendment so as fully to prohibit the business not only by lawyers but by laymen. Soon after an action was taken under the act, whose constitutionality was attacked, but the Supreme Court of the United States confirmed the act as constitutional.

Fred. C. Johnson, chief adjuster of the claim department of the San Antonio Public Service Company, has issued in handy form a copy of the law.

Denver Company Stands Firm

Has Recruited 700 Out of 1,100 Men for Permanent Service Since Strike—New Men Will Be Retained

Striking trainmen of the Denver (Col.) Tramway met on Aug. 20 upon call of G. Y. Harry, Portland, Ore., federal mediator. In this meeting the applications to return to work, which had been signed by 940 strikers on Aug. 16 in an effort to prove their good faith and stave off jail sentences for the executive committee and officials of the union, were torn up. The executive committee sent from jail a written statement urging the men not to go back to work.

ANOTHER mass-meeting was held Sunday morning to act upon what was announced by Mr. Harry as "a new proposition to end the street car strike." The proposal was submitted to F. W. Hild, general manager of the railway, Monday morning. It was virtually a reiteration of all previous demands with the exception of the demand for recognition of the union. In fact, reference to the Amalgamated or Local Division No. 746 was carefully avoided.

700 Men Return

The letter, which was addressed to Mr. Harry, was signed by two of the striking trainmen as "Presiding Officer" and "Secretary," respectively. They agreed that the men would return to work provided they were taken back 100 per cent, the company to remove all strikebreakers and discharge all men employed since the beginning of the strike, arbitrate the increase in wages from 58 to 75 cents an hour after the Supreme Court decision in the tramway injunction case, restore the seniority rights of the strikers and the company enter into a working agreement with the strikers after their return.

Nearly 700 men, including old employees who have returned to work, have been employed as permanent members of the new organization which the tramway is building up. These men, together with about 300 remaining strikebreakers, are taking the place of the 1,150 strikers.

The company the same day rejected the strikers' proposal, stating that on Aug. 10, in response to a statement from the former employees that they were ready to go back to work, it had given the strikers ample opportunity to return to work with former seniority rights and former wage schedule. Those employees who had not returned within the time limit set had been cut off from all seniority rights and wage standing, and would have to come back into the company's employ as new men.

Company's Position Stated

General Manager Hild's letter further stated:

> The position and policy of the Tramway Company with respect to its employees has not changed. For your information I wish to say that at the present time, entirely apart and above the first group of temporary employees originally brought here by the Jerome agency, we have since Aug. 12 taken on more than 600 permanent employees, most of them from the city of Denver and the state of Colorado, whose positions and seniority rights have been assured them and must be respected. Certainly in fairness to these new, permanent employees no one can reasonably and honorably expect that we will dismiss them from our service in order to make room for former striking employees who have, up to this late date, failed to avail themselves of the opportunities extended to them to return to work.

Mr. Hild was asked whether he would discharge any new men to make places for strikers. He said that the company would remove strike-breakers as fast as possible, but no permanent employee would be discharged to make room for anybody.

Asked whether the men on strike would be taken back in a body and whether all of them would be re-employed, he replied: "They can't be. We have between 600 and 700 new employees now."

Another mass-meeting of the strikers was held at 4 o'clock Monday afternoon to receive Mr. Hild's reply to their proposal.

The North Division car barns of the tramway were cleared of strikebreakers Saturday morning and all cars from this division, as well as South Division, are being operated by new men. At the rate new employees are being put to work, it is anticipated that the entire system will be operated without strikebreakers by Sept. 30.

Violence Again Resorted To

Saturday and Sunday two cars were mobbed and their crews beaten by strike sympathizers. As a result, two soldiers were placed on each car run through trouble zones.

Car service is rapidly being restored to normal; trailers being operated on fully half of the lines.

The Supreme Court of Colorado was appealed to on Aug. 25 to release seven members of union's executive committee, who are serving ninety days in jail for contempt of court. The city's attorney characterized the strike as "a willful and violent violation of the law and a breach of faith with the District Court. The tramway has obeyed the order against it to the very letter, but the men determined they would violate this injunction. They determined they would break faith with the District Court, the court they had told they did not object to an injunction."

Attorneys of the union men, while admitting that they were in contempt of court, claimed that the District Court had no jurisdiction and could not prevent any American citizen from quitting work.

Apart from this action of the union the tramway strike situation appears hopelessly deadlocked. Conciliator Harry of the Department of Labor announced: "I am simply watching the situation. I have no present intention of making any new demands to settle dispute within the next few days."

Reports are circulating that the strikers will modify the conditions under which they will agree to return to work. Eight hundred and fifteen new men and returned strikers had been employed up to Thursday morning to replaced 1,150 strikers. Tramway officials reiterate that the strikers have waited too long, for no new men will be discharged to make way for strikers.

On Aug. 26 all cars from the East Division were operated by new permanent employees. Only one division then remained to be manned by new men. More than 500 strikebreakers have been shipped out of town to date.

The Colorado Supreme Court on Aug. 26 denied the application of the executive heads of the Tramway Employees' Union for a stay of execution, and an order directing the District Court to release them under bond. The court intimated that after the application for a writ of supersedeas the strike leaders may be admitted to bail. The hearing of the supersedeas probably cannot be had until late September.

Akron Reports Progress on New Grant

So far only a small part of the proposed new street railway ordinance between the city of Akron, Ohio, and the Northern Ohio Traction & Light Company has been tentatively agreed upon. All the points agreed upon have, however, been made public. Announcements have been made by the city that the ordinance provides for city control over service. That is one point which has been tentatively agreed upon. Another point which meets the approval of both the city and the company is that the basis of the contract shall be a service-at-cost plan similar to the service-at-cost plans in other cities throughout the country. In the new ordinance provision is being made for the purchase of the property when the city desires. The new grant will also give the city control over service, and provide for extensions that may be necessary from time to time.

Men at Nashville Strike

Despite the strike of union conductors and motormen cars of the Nashville Railway & Light Company, Nashville, Tenn., were running the first of the week following the Sunday stoppage. Service was 70 per cent normal on all lines Monday and Tuesday. It was decided not to operate after 6 p.m., until conditions more nearly normal are restored. Mayor Gupton of Nashville, issued a statement urging all stores and factories to close at five o'clock in order that employees might ride home. The strike was not unexpected. Some weeks ago, however, the union asked a closed shop and a 25 per cent advance in the wage schedule. The same day the company posted a notice of a new schedule of pay amounting to about 12½ cents, but the demand for the closed shop was refused. Not all the trainmen are members of the union.

D. U. R. Plans Improvements

Insists on Carrying Out Work for Relieving Congestion—City Suspects Company's Motives

Permission is again sought by the Detroit (Mich.) United Railway to construct a single-track loop to turn Woodward Avenue cars at Grand Circus Park. The proposed plan is to swing east at Elizabeth Street and return to Woodward Avenue at the Park. The necessity for the loop is emphasized in a communication to the City Council by E. J. Burdick, general manager for the railway. The loop is suggested as a means of relieving congestion.

This question was brought up before by the Detroit United Railway just prior to the election on April 5, when the bond issue was carried providing for the construction of the municipal railway.

Corporation Counsel Raises Old Question

In the endeavor to obtain this permission, Corporation Counsel Wilcox sees another attempt on the part of the railway to obtain rights in the street that it may come into court at a later date and make claim that in allowing the loop the city admitted that the company had rights in Woodward Avenue. He maintains that exactly the same question is raised as when the company sought to continue work on the St. Jean, West Warren and Harper lines after the Couzens plan was approved by the voters. Further work was prevented on these lines by the city's orders and a rescinding resolution passed by the Council.

The city's rights were decided by the Supreme Court in 1913 when it was held that the city could take over the Fort Street and Woodward Avenue lines in the downtown district, and the Corporation Counsel recommends that the company's petition be denied as it was before when it was held that to grant the petition would confuse the municipal plan issue.

Construction Contracts Being Let

Although several members of the Council maintain that the voters in the April 5 election decided on what streets certain municipal lines should be built, and that any amendments to the people's action cannot be taken according to the charter until six months have elapsed, a resolution was passed by the Council ordering the Street Railway Commission to make a study of alternate routes which might be taken instead of the proposed one on Burlingame Avenue west of Hamilton Boulevard. This action on the part of the Council is the result of petitions by the property owners along that section of the proposed line.

Immediate action will be taken by the contractor in starting excavation and foundation work for the road bed of the Charlevoix-Buchanan crosstown municipal line. This line extending across the city for a distance of about 9 miles will be the first important line of the new system. Contract for the foundation work entails an expenditure of approximately $605,500.

Total construction contracts amounting to $1,600,000 have been entered into and $1,750,000 bonds have been authorized.

Interurban to Build Detour

Residents of Lockport, Ill., have in prospect a walk to the outer edge of the city if they intend to use the Chicago & Joliet Electric Railway for transportation. That company intends to detour its line avoiding Lockport. There is good reason for this. The franchise of the company in Lockport will expire on Feb. 18, 1921. The tracks of the company through the city are in bad condition and the company tried on several occasions since 1917 to have its franchise renewed so that it could reconstruct the tracks. The terms of the city administration were prohibitory.

After the company had submitted to the city several propositions which seemed fair, all of which were rejected by the city, the company finally sought relief through the Public Utilities Commission, which ordered the railway to build the detour, with the right of eminent domain. Upon the issuance of this order a delegation of Lockport citizens waited on the company and suggested a settlement. The railway then submitted a draft of an ordinance acceptable to it. Action was taken on this at a meeting of the Council and it was voted down four to two.

The company plans to proceed to acquire a right-of-way, and build a detour for operation by Jan. 1, 1921. The detour means the lengthening of the interurban line 1 mile between Joliet and Chicago. At the center of the city the new line will be about 0.95 of a mile east of the present location.

Monongahela Company Advances Wages

Substantial wage increases were granted employees of the Monongahela Valley Traction Company, Fairmont, W. Va., at the closing of negotiations on July 21, when members of unions No. 812 and No. 813 voted unanimously to accept the contract which had been agreed on by their representatives and the company. The new contract covers the period from July 1, 1920, to July 1, 1921.

The scale of wages under the old contract was from 45 to 55 cents an hour. Under the new agreement the men will receive wages on a sliding scale basis covering two and a half years and ranging from 51 to 63 cents. This means that beginners will receive 51 cents an hour, employees who have been in the service six months 52 cents, those of one year's employment 54 cents, those in the service a year and a half 57 cents, and so on. The closed shop plan will be carried out as in the past. The company owns 190 miles of track and serves Fairmont and neighboring towns.

Auto Drivers Strike

One Thousand Men at Los Angeles Return to Work Following Compromise

Motor stage drivers of the Motor Transit Company working out of Los Angeles, Cal., went out on a strike on Aug. 17 for a 25 per cent increase in wages, thus tying up service on nearly 500 auto stage buses. Close to 1000 men are out. Only a few stages were in operation, the drivers of others failing to appear for their scheduled runs. The stage companies claim the drivers went out without notice. Patrons of the bus lines were obliged to use steam and electric railways to reach their places of business. The bus drivers are organized as the Operators of Motor Transport.

Treat Men as Individuals

Managers of the companies indicate that they will be willing to deal with the car owners as individuals, but not as members of an organization, and restore them to their old runs at the old rate of pay, $32. per trip, Los Angeles to San Diego.

The manager of the Motor Transit Company states it is impossible to grant the raises in pay asked by the drivers until the State Railroad Commission grants increased passenger fares. He states that the drivers between Los Angeles and San Diego own their own buses and are paid $16 for a one-way trip of 127 miles, or $32 for the round trip, and out of this allowance the drivers pay all expenses of the trip. All the drivers on the Bakersfield run do not own their cars and are paid $4 on a one-way trip of 171 miles with an eight-passenger car and $5 for a one-way trip over the same route with an eleven-passenger car.

After one week the strike was called off on Aug. 22. A settlement was effected and the drivers returned to work. Both sides made concessions. It has been agreed that all drivers are to be paid increases, but the advances will not reach the figure originally demanded by the strikers. The motor transit company, however, made promises of further advances if it is permitted by the Railroad Commission to raise its rates. An application for a hearing is now pending before the commission.

Men Own Their Cars

The drivers employed on the Los Angeles to San Diego runs, under the new agreement, will be paid $35 for the round trip. The strikers demanded $40. They had been receiving $32. The men own their cars, leasing them to the Motor Transit Company, which sells bus transportation to the public. If a rate raise is granted the corporation drivers will be paid $40 a round trip. Drivers on other runs where cars are owned by the Motor Transit Company are likewise to be given an increase in salaries. These drivers are hired outright.

News Notes

Increase for Long Island Traction Men.—The New York & Long Island Traction Company, Hempstead, N. Y., recently advanced the employees' wages 10 per cent.

Strike Action Delayed.—Strike action by employees of the Toledo, Bowling Green & Southern Traction Company Toledo, Ohio, has been delayed, according to announcement made by officials of the union on Aug. 20. The men are demanding an increase in wages of 40 per cent.

Strike at Ashtabula Settled.—Because of an order from the company that cars would be operated as one-man cars thereafter, the trainmen of the Ashtabula (Ohio) Rapid Transit Company walked out on Aug. 5 and the road was idle for the greater part of the day. The company finally agreed to resume service with crews of two men.

Boston Men Receive Wage Award.—More than 7,000 trainmen of the Boston (Mass.) Elevated Railway shared in the distribution of between $225,000 and $250,000 on Aug. 12 and 13. The distribution is the carrying out of the award handed down on June 7. According to the officers of the union the average payment per member was between $35 and $40.

Trackmen Return to Work.—Between 100 and 125 trackmen and oilers employed by the Monongahela Valley Traction Company who struck on Aug. 2 returned to work on Aug. 9, after they had been granted a wage increase from 38 to 46 cents an hour. Under the new agreement the men will work nine hours a day and will receive time and half for overtime and for Sundays and holidays. They asked 50 cents an hour.

Requested to Complete Improvements.—The Dallas (Tex.) Railway has been called on by the city authorities to spend between $300,000 and $500,000 on right of way improvements on certain streets. Four street paving projects involving expenditures by the company were outlined by Mayor Wozencraft, who notified the company that the city desired to have these projects completed before May 1, 1921, and that traction company was requested to notify the city of its intended action by Sept. 20 next.

Trackmen Accept Compromise.—Trackmen in the employ of the United Traction Company, Albany, N. Y., to the number of 150 have accepted the compromise offer of an increase of pay of 13 cents an hour. The men have been receiving 42 cents an hour. They asked for 15 cents an hour increase, or 57 cents, but after a number of conferences in which 53 cents an hour was rejected the men voted to accept 55 cents. The agreement will go into effect from July 1 last, and will continue for one year.

Mayor Favors City Ownership.—Mayor David L. Whiton, Quincy, Mass., recently announced that he favored municipal operation and ownership for the Quincy division of the Eastern Massachusetts Street Railway rather than have the city pay the deficit of $137,000 which Homer Loring, chairman of the public trustees of the company, declared had accumulated because of low fares since Jan. 1 of this year. Under the Public Control Act municipalities may be called upon to make up the deficit in the operation of the electric railway lines.

Wages Adjusted on Ohio Electric.—Agreement on a wage scale for trainmen employed by the Ohio Electric Railway in the cities of Lima, Newark, Springfield and Zanesville, Ohio, prevented a walkout of nearly 1,100 men. The men had asked 75, 77 and 80 cents an hour to supplant the present scale of 38 to 40 cents an hour for city men and 41 to 50 cents an hour for interurban employees. The closed shop was also asked. The company offered city men 43 to 50 cents an hour and interurban men 46 to 55 cents an hour. More was promised as soon as fares are increased in all the cities.

Rapid Transit Extensions in Brooklyn Opened.—The Eastern Parkway and Nostrand Avenue (Brooklyn) extensions of the Interborough Rapid Transit system began running at 12:40 o'clock on Aug. 23, thus furnishing rapid transit facilities to a large section of Brooklyn not served heretofore. This section extends for approximately three-quarters of a mile outside the new routes, as well as the large triangle between President Street and Utica and Flatbush Avenues. These extensions, which complete the principal Brooklyn link of the Interborough system, consist of 5½ miles of a four-track subway. Of the fourteen stations on the extensions only eleven are now open, because the others are not sufficiently near completion to make it safe to use them.

Company at Rutland, Vt., Advances Wages.—Announcement has been made by the officials of the Rutland Railway, Light & Power Company, Rutland, Vt., of the granting of an increase in wages to the employees. About thirty-five motormen and conductors will be affected by the new advance wage schedule. They will get an increase in pay of 10 cents an hour, making the minimum wage for a motorman or a conductor who has worked six months or more, 53 cents an hour. New employees will be paid at the rate of 49 cents an hour for the first three months, 51 cents for the next three months and 53 cents for service after that. The trackmen have received an advance of 25 cents a day, making the salary for their day's work $4.75.

Macon Men Get More.—Motormen and conductors of the Macon Railway & Light Company, Macon, Ga., have made a new working contract with the company whereby they will receive from 12 to 16 per cent increase in pay. The employees of the operating department under the new contract, which dates from Aug. 1, receive from 40 to 53 cents an hour and double time for working holidays. Under the new scale the men can make as much as $200 per month by working extra time. The employees of the mechanical department were also given an increase. The car inspectors, who are now working on a salary basis, are also asking for an increase in pay. A few months ago they were given an increase of $10 per month.

Ban Proposed on Natural Gas.—Five state public service commissions are to meet on Sept. 10 to consider whether natural gas for firing boilers and for certain industrial heating operations will not be cut off altogether in order to insure more nearly adequate supplies for domestic users and industries which are regarded as more essential. The States involved are Pennsylvania, West Virginia, Ohio, Maryland, and New York. It seems certain that the Pennsylvania commission, at least, will follow out certain of these recommendations, and effort is being made to have the other commissions co-operate so that a joint action to this end can be taken. If the proposed regulations now under consideration are adopted, public utilities generating current from natural gas will have to use other fuels.

Parson a Conductor on Interurban.—The Auburn & Syracuse Railway, Auburn, N. Y., has the distinction of having in its employ Rev. H. H. Van De Myer, the conductor-parson. Rev. Van De Myer, who was studying in Auburn, found that employment as a conductor on the South Street Lake run was best suited as a means for him to earn money to continue his studies and accordingly accepted a job for the summer. His fellow employees soon learned that besides being a very efficient fare collector, he was also an ordained Presbyterian minister and he was recently prevailed upon to officiate at a ceremony by which Berton F. Hoskins, a motorman, became a benedict. Rev. Van De Myer appeared in his brass buttoned coat, disregarding clerical attire. The bridegroom also wore his working uniform. The clergyman is studying for his doctor of divinity degree at the Auburn Seminary.

Program of Meeting

Iowa Electric Railway Association

The mid-year convention of the Iowa Electric Railway Association will be held on Sept. 16 and 17 at the Fontanelle Hotel, Omaha, Neb. A program of great interest to mechanical and operating men is being prepared. It will be announced in the near future.

Financial and Corporate

Financing Method Attacked

Detroit United Railway Keeps Up Its War on City—Seven Suits Now Pending

The city's methods of obtaining money for the new Detroit municipal lines by the sale of bonds to the sinking fund commission is the basis of the latest suit filed by the Detroit United Railway in the District Court against the city. This is the seventh suit filed by the Detroit United Railway. In it the city is charged with juggling funds to raise money.

Wants Legality Established

The Detroit United Railway is now seeking to enjoin the prosecution of construction work and further purchase of railway public utility bonds by the sinking fund commission. It is claimed that the city has violated the charter by selling the bonds to the sinking fund commission, thus indirectly using the tax money for street railway financing.

Mayor James Couzens, Controller Steffens, City Treasurer Ingalls, the three members of the Street Railway Commission and the eight councilmen are named as defendants. Commissioner of Public Works Martin and the contractors who have been awarded contracts are also made defendants. The contracts which have been entered into by the city are held to be illegal. The Mayor, the Comptroller and the Councilmen are all members of the sinking fund commission.

Word has been received from Washington to the effect that the Detroit United Railway has also filed an appeal with the United States Supreme Court asking a permanent injunction restraining the city of Detroit from building the proposed municipal ownership lines. This appeal from the adverse decision of Federal Judge Arthur J. Tuttle in the case of the first two suits filed against the municipal lines, one by the Detroit United Railway and the other by the New York Trust Company and is based on the claim that the election authorizing the municipal ownership is invalid and the $15,000,000 bond issue for its construction is illegal.

City Commission Going Ahead

The Street Railway Commission is ignoring the company's actions. It maintains that substantial progress is being made with regard to the new lines. Construction superintendents have been hired and it is expected that track laying will be started soon. Efforts will later be turned to the planning of carhouses and overhead systems. Plans are already being worked out for the type of cars to be used on the municipal line.

In commenting on the city's plans for financing, the Detroit United Railway points out that of the $1,750,000 of railway bonds that have been sold, $1,628,000 have been taken by the city itself and paid for out of sinking fund and invested funds cash, money raised by taxation. Mayor Couzens purchased $100,000 of bonds and the general public $22,000.

Council Confirms Bond Sale

The Council has confirmed the sale to the sinking fund commission of $1,450,000 of railway bonds bearing interest at the rate of 5½ per cent. The first two issues bear only 5 per cent interest.

When the company applied for authority to build the Elizabeth-Grand Circus Park route for the relief of the Woodward Avenue service by doing away with the necessity for all Woodward cars going through the congested section, the Council suggested that the loop be built by the street railway commission and rented to the Detroit United.

Private Company Ready to Build

This loop, according to the Detroit United Railway, could not be built by the city under the present authorization, as none of the $15,000,000 of bonds cover this piece of track work. On the other hand, the company points out that it has the rails and other material on hand for the immediate completion of the work.

Dividend Increase Voted Down

The ordinance increasing the dividends of stockholders of the Cleveland (Ohio) Railway from 6 to 7 per cent was defeated about three to one in a referendum vote on Aug. 12.

J. J. Stanley, president of the company, stated that an attempt will be made to sell stock for the purpose of securing funds for carrying out the improvement program for next year, but that it will be offered over the counter at par. Whether this can be done successfully remains to be seen, as the stock is now quoted below par on the stock exchange.

The increase in dividends was asked in order to make the stock more attractive. It is said that the company will ask for a new rate of fare of 6 cents, with 1 cent for transfers, before Sept. 1. This will not only strengthen the stock, but will be necessary to meet the expenses.

This year's program of extensions will be completed, but Mr. Stanley said that work for next year will have to go until additional funds are secured to carry out the program which the company contemplates putting through.

Rhode Island Sale Ordered

Trustees Required to Sell Stock—Some Lines May Be Abandoned and Scrapped

The Rhode Island Company, the Providence & Danielson Railway and Sea View Railroads will be sold at public auction on Sept. 3, in Providence, R. I., according to an announcement made on Aug. 24 by the Federal Trustees.

The trustees will sell the stock of these roads and the purchaser will then obtain possession and control of the physical properties. The sale is authorized by the United States District Court for the Southern District of New York which has entered an order directing the trustees appointed by the Court to dispose of the property before Sept. 4.

The sale of the Rhode Island Company includes the Providence and Burrillville and the Woonsocket lines. The Danielson line includes the Chepachet line from Providence.

The lines of the United Traction & Electric Company and the Rhode Island Suburban Railway, which are leased by the Rhode Island Company, are not affected by the sale.

Disposition of Roads Uncertain

Just what will become of the properties after they are sold is a problem. There are interests seeking to get hold of the Chepachet line, which is a part of the Danielson line, but they do not want the line from Providence to the State line to Danielson, Conn.

The general impression is that the Danielson and the Sea View lines will be junked. As noted elsewhere in this issue these two lines are to be turned back to their owners on Sept. 7 by the receivers of the Rhode Island Company, by authority of the Superior Court.

When the Federal Trustees learned of this, knowing that the lines did not pay and that the trustees had no money with which to operate them, they applied to the Federal Court in New York for instructions. The result was that the court ordered the sale of these two lines and of the Rhode Island Company as well.

The sale of the Rhode Island Company involves the entire 96,885 shares of outstanding stock held by the trustees. At the same time 9,132 shares and $600,000 in bonds of the Providence & Danielson Railway, and $700,000 in stock and $600,000 in bonds of the Sea View Railroad will be sold.

Public Service Railway Appraisers Named

State Comptroller Bugbee and State Treasurer Read, of New Jersey, members of the commission created by the last Legislature of that state to value the property of the Public Service Railway for rate making purposes, on Aug. 24 announced the selection of the firm of Ford, Bacon & Davis, New York, to do the actual work of appraising.

The act of the Legislature under which the appraisal will be made was a storm-center from the time of its introduction before the Legislature. The measure was passed in April, but was promptly vetoed by the Governor. He considered that it was loosely drawn and offered an invitation to litigation. The bill was then passed over the Governor's veto. Under the law the Governor was designated as a member of the valuation commission, but he announced that he would not serve.

According to the bill the valuation commission consisting of the Governor, the State Treasurer and the State Comptroller was constituted "for the purpose of ascertaining and determining the value of all the property, including every proper and lawful element thereof, of any or all street railway and traction companies" in the State of New Jersey. The manner in which this is to be carried out is prescribed by the selection of "a competent electrical or mechanical engineering concern of the highest established reputation, equipped and organized for and experienced in the work of valuing street railway property."

When the value of any property has been completed as directed by the act, "the value of the property as set forth in said report shall be accepted by the Board of Public Utility Commissioners of this state as the value of said property as of the date specified in said report in any rate proceeding under any law of this state to the extent that the value of said property is a factor in the fixing of a rate."

Opponents of the measure contend that the act is defective in that proper provision is not made for the review of the findings of the engineers.

New Haven Trolleys Do Better

The results of the operations of the various electric railway properties of the New York, New Haven & Hartford Railroad for 1919 are unsatisfactory, but there are signs that the situation is improving. Operating revenue and the total operating expenses increased respectively 11.4 per cent and 12.1 per cent over that of 1918. The increase in the net operating revenue was a little more than 7 per cent. The non-operating income fell far short of the previous year. The decrease in this item was about 22 per cent. On the whole, however, operations were slightly encouraging as the net income, which showed a deficit, decreased over 1918 by 3.3 per cent.

The volume of business done by the various companies is increasing. Valuations of the Connecticut Company show property substantially equal to the securities, and valuations of the other road controlled by the New Haven but not included in the Connecticut Company would probably show the same results.

Municipal Roads Go Behind

Figures for 1917 Show a Deficit in Net Income for Eight Publicly Operated Roads of $141,896

The census bulletin for electric railways for the year 1917, recently issued by the United States Bureau of Census, presents for the first time a separate table showing the operating and financial statistics of municipally-owned and operated electric railways.

The accompanying table gives the names on nine municipal companies, together with the total passengers carried by each, and their miles of track and number of passenger cars. The net income is shown except in the case of the Monroe Street Railway and the Capitol Car Line, where the deficit from operating expenses is given.

Figures for the Bismarck line are not included in the totals of operation, a full report upon the road not being obtainable. The total operating revenue is given as $2,426 and the total operating expenses at $7,770 so that there was at least an operating deficit of $5,344 before fixed charges were approached.

The St. Louis Water Works Railway might well have been omitted from the table. This road was built primarily for the purpose of transporting freight and employees of the city water works. Of the total of 358,851 passengers, 215,603 were carried free. The figures of operating revenue and expenses given by this road are misleading, operating revenue being $29,103 and operating expenses at exactly the same amount. No deficit in either gross or net income is indicated although a cash investment of $274,800 is admitted.

For the eight roads covered by the totals of the Census Bureau the income account shows:

Operating revenue	$1,682,354
Operating expenses	1,462,719
Net revenue railway operations	$219,635
Taxes	126,146
Operating income	$93,489
Non-operating income	$28,608
Gross income	122,097
Deductions from gross income:	
Interest on funded debt	262,977
Interest on unfunded debt	1,016
Total deductions from gross income	263,99[illegible]
Net income	*$141,896

* Deficit.

This deficit does not show the true conditions of operation for two reasons. In the first place, in the St. Louis and Monroe operations, no provision is made for the payment of interest on the funded debt, although in the case of St. Louis, there is an investment of $274,800 and in Monroe, an investment of $90,550. In the second place, only in San Francisco, Lincoln and Tacoma is there any allowance for taxes, and in

	Total Passengers	Miles of Track	Passenger Cars	Net Income
Municipal Railway of San Francisco	36,234,723	58.55	197	*$103,908
Monroe Street Railway	935,776	9.11	9	†12,774
Municipal Lines of Seattle, Wash.	899,387	23.37	14	*34,938
Municipal Street Railway of Alexandria	825,075	6.40	12	*1,189
St. Louis Water Works Railway	353,851	13.60	7	
Pekin Municipal Railway	364,817	3.11	5	4,345
Tacoma Municipal Railway	254,292	6.79	9	7,405
Lincoln Municipal Railway	169,562	4.61	6	*867
Capitol Car Line of Bismarck, N. Dak.	48,525	1.00	1	†5,344
Total	40,086,008	126.54	260	

* Deficit in net income.
†Deficit in operating expenses.

STATEMENT OF EARNINGS OF ELECTRIC RAILWAYS CONTROLLED BY NEW YORK, NEW HAVEN & HARTFORD RAILROAD FOR 1919

	New York, Westchester and Boston Railway		Berkshire Street Railway Company		The Connecticut Company		New York and Stamford Railway		The Rhode Island Company		The Westchester Street Railroad		Total	
	1919	Per Cent Increase Over 1918	1919	Per Cent Increase Over 1918	1919	Per Cent Increase Over 1918	1919	Per Cent Increase Over 1918	1919	Per Cent Increase Over 1918	1919	Per Cent Increase Over 1918	1919	Per Cent Increase Over 1918
Total operating revenues	$752,307	30.0	$918,644	3.1	$11,043,805	11.5	$434,003	15.9	$6,970,675	10.4	$298,585	22:9	$20,418,019	11.4
Total operating expenses	662,594	19.1	868,178	—19.7	9,210,376	13.0	388,824	16.1	5,928,263	15.9	336,855	15.4	17,395,090	12 1
Net operating revenue	$89,713	305.0	$50,466	1.3	$1,833,429	2.7	$45,179	11.8	$1,042,412	—12.8	*$38,270	21.8	$3,022,929	7 4
Taxes	147,810	3.5	64,371	4.1	619,658	7.6	23,676	2.4	621,885	2.9	11,918	22.0	1,489,318	5.0
Operating income	*$58,097	51.8	*$13,905	9.5	$1,213,771	0.4	$21,503	24.4	$420,527	—29.0	*$50,188	14.5	$1,533,611	9 9
Non-operating income	7,883	105.0	1,694	57.4	232,831	— 3.8	608	— 6.0	37,853	—65.8	879	156.0	281,748	—21.6
Gross income	*$50,214	57.0	*$12,211	95.3	$1,446,602	— 0.3	$22,111	23.3	$458,380	—34.8	*$49,309	15.5	$1,815,359	3 4
Deductions from gross income	1,672,930	3.8	317,397	— 0.6	1,338,567	7.3	97,458	1.5	1,491,760	0.8	35,654	7.4	4,953,766	3.4
Net income	*$1,723,144	0.3	*$329,608	41.3	$108,035	—46.5	*$75,347	3.5	*$1,033,380	29.1	*$84,963	7.2	*$3,138,407	— 3 3
Profit and loss account	*$11,667,095	....	*$1,724,789	.....	$2,653,854	.....	*$324,571	.....	*$1,262,684	.....	*$355,740	....	.....	...
Miles of single track	54.41	....	163.08	.....	696.48	.....	36.29	.....	299.11	.....	28.09	....	.....	...

* Deficit.

the two latter this is below what a private company would have to pay. If the interest on the investments of the two companies mentioned had been added, as had also the taxes for five of the companies not taxed, then the deficit in net income would have been larger. These facts lead to the conclusion that the showing made by municipally owned roads is not very impressive.

Loss of $17,135 in Jacksonville in July

Unless the rates of carfares of the Jacksonville Traction Company, Fla. are increased, the company will not be able to continue to function. The existing conditions are not suitable as shown by the report for the month of July, 1920, with cash on hand on July 1 of $48,617, the report, filed in the office of the clerk of the Federal Court, shows that the expeditures were such as to leave a balance on Aug. 1 of only $31,482 in cash, a loss during the month of July of $17,135. The statement follows:

Cash on hand July 1	$48,617
Passenger receipts	86,717
Sale of tickets	380
Accounts received, miscellaneous	1,885
Miscellaneous	53
Total railway revenue	$137,652
Salaries and wages	46,999
Supplies	9,266
Supplies—fuel	31,955
Accidents causing expenditure	1,299
Taxes	7,850
Miscellaneous expenditures	8,471
Total operating expenses	$106,170
Balance on hand Aug. 1	$31,482
Balance of accounts assumed and unpaid Aug. 1	$3,542

Plea for Sale at Foreclosure Entered

Counsel for the Guaranty Trust Company, New York, N. Y., as trustees for the holders of the first mortgage bonds of the New York Railways sought on Aug. 17 to have Judge Julius M. Mayer of the United States District Court accept and enter a proposed decree which would end the receivership of the surface railway system by putting it up at auction. After a protracted hearing the court deferred consideration of the subject until Nov. 10.

Joseph P. Cotton, in offering the decree, declared that the property, now in the hands of Job E. Hedges, receiver, should be sold for the benefit of the senior bondholders before equities are further diminished, but evidence introduced by counsel for the company disclosed the fact that many of the surface lines are showing a large increase in revenue, attributed mostly to action of the courts in eliminating competitive city buses.

E. H. Blanc, representing the junior mortgage holders, and Frederic Coudert, counsel for additional interests, pronounced the proposed decree premature and discriminatory. It was finally decided to sell, but not under a foreclosure decree, certain unused carhouses. The court ordered another hearing on Oct. 18 on winding up the receivership.

Financial News Notes

Texas Line Suspends.—The Longview & Junction Railway, Longview, Tex., has suspended operation indefinitely. The line is 1 mile in length.

Resort Lines Suspend.—The Jersey Central Traction Company, operating 44 miles of line with principal offices at Keyport, N. J., shut down its Keansburg division and Carr Avenue lines on July 19. The lines which have been abandoned comprise less than 2 miles of the entire road. The business which is offered in these places, it is explained, is all being cared for by jitneys.

Refunding Issue Authorized.—The Public Utilities Department of Massachusetts has authorized the Holyoke Street Railway to issue bonds to the extent of $85,000, to mature in April, 1935. They will bear interest at 6 per cent. The new issue is planned to provide funds to refund an issue of $85,000 of Holyoke Street Railway debenture 5s dated 1899 and due Oct. 1, 1920.

Abandonment Plans Before Commission.—The Westchester Street Railway and L. S. Miller, receiver, have applied to the Public Service Commission for approval of the action of the company on June 29 in a declaration of abandonment of the Westchester Avenue and Mamaroneck Avenue lines on the ground that "they are no longer necessary for successful operation of its road and the convenience of the public."

Receiver for Ashtabula Road.—The Ashtabula, (Ohio) Rapid Transit Company has been placed in receivership, resulting from failure of the city to take over the lines as a municipal system as contemplated. The city withheld action until an agreement could be reached regarding $350,000 bonds of the company and because some creditors were unwilling to pro-rate their claims with the bondholders.

Railway Being Dismantled.—The work of removing the abandoned trackage of the Shore Line Electric Railway from New Haven to Flanders, Conn., is now under way. The American Railway Equipment Company, New York, is in charge of the work. Two months will be required to remove the 60 or more miles of rails. Insufficient patronage to support the road, followed by a strike of its employees who demanded increased wages, caused this public utility to pass into the hands of a receiver.

Purchased Companies Are Dissolved.—The United Light & Power Company which was organized in East Moline on Feb. 2, 1908, but later was purchased by the Tri-City Railway & Light Company, Davenport, Ia., has been dissolved and its charter surrendered to the Illinois State Secretary. The same has been done with the Watch Tower & Campbell's Island Park Company. Officials of the Tri-City Railway & Light Company explain that the dissolution of the companies was merely to clear up their records. Both of the companies were purchased by the Tri-City Railway & Light Company and ceased to exist several years ago so far as operation was concerned.

Preparing Reorganization Details.—The International Railway, Buffalo, N. Y., on Aug. 18, made application to the Public Service Commission for the Second District, for approval of the increase of its capital stock from $17,000,000 of which $16,707,500 is outstanding, to $17,500,000, consented to by the stockholders in writing and also authorizing the issue of $792,500 in capital stock which shall or may be sold to the protective committee for collateral trust 4 per cent bonds of the International Traction Company, now owner of all the stock of the railway, at a price not less than par. The commission will give early consideration to the petition.

No Action in P. R. T. Lease Controversy.—The Union Traction Company, Philadelphia, Pa., has yet to appoint a committee to meet the four directors of the Philadelphia Rapid Transit Company picked to deal with them in regard to the resignation as a Union Traction director, of Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, following the refusal of the Union Traction directorate to assent to the $6,000,000 car trust certificate issue sought by the P. R. T. except on terms deemed excessive by the P. R. T. The next regular meeting of the Union Traction directors is scheduled for Sept. 18 and if no meeting is held before that time, the compromise agreement espoused by J. J. Sullivan, president of the underlying body, will have to wait.

Rhode Island Company Will Discontinue Some Lines.—The receivers of the Rhode Island Company, Providence, R. I., have decided to discontinue operation of cars over the Chepachet, Danielson and Sea View lines after Sept. 6. The federal trustees, as yet, have made no decision, as to the future of the lines. The Chepachet line is the newest of the three, having been opened about five years ago. It runs to Greenville, Harmony and Chepachet. The Sea View runs through Wickford, Hamilton, Saunderstown, Narragansett Pier, Wakefield and Peace Dale. The Danielson line touches, North Scituate, Rockland, Clayville, Foster Centre in Rhode Island and East Killingly. Elmville, Danielson, Dayville and Putnam in Connecticut. Other phases of the affairs of the Rhode Island Company are referred to on page 433 of this issue. As indicated there the holdings of the company will be sold on Sept. 3 unless court action, unforeseen now, should intervene.

Syndicate May Purchase Railroad for Automobile Road.—The Ocean Shore

Railroad, San Francisco, Cal., recently discontinued operation on account of labor troubles. Primarily this was due to the increase in wages, but also to the difficulty of maintaining satisfactory service under present labor conditions. Several months ago a syndicate of real estate men made a proposal to buy the property, sell the rolling stock, scrap the rails and construct an automobile road along the right-of-way. Although this proposal was abandoned for a time it is now being revived. The Ocean Shore Railroad is a broad gage line running from the depot at Twelfth and Market Streets, San Francisco, to Tunitas, about 38 miles down the coast. The company has a total of 54 miles of track and the terminals in San Francisco are electrified.

Franchise Passed at Bellaire.—The Council of Bellaire, Ohio, passed the Wheeling Traction Company franchise ordinance, inserting a provision authorizing the solicitor to institute injunction proceedings to oust the company if the franchise is not accepted in thirty days. If the company declines to accept the franchise, the solicitor is empowered to attempt to stop the company from operating in Bellaire, and to compel the removal of its tracks, cars, poles, and other equipment from the streets of the city. The ordinance has been passed twice previously, with provisions that it must be accepted within fifteen days, but due to delays in getting the ordinance into the hands of the company officials, ouster proceedings were not instituted.

Interurban Has Deficit of $727.—The Northwestern Ohio Railway & Power Company, which operates the interurban line connecting Toledo, Lakeside and Marblehead, announced that it had a deficit of $727 for the year ending June 30. The company has outstanding an issue of first mortgage 5 per cent bonds totaling $1,293,000, the interest charges on which amounted to $64,650. The total revenue for the year was $392,663, an increase of 22.1 per cent over the previous year. The expenses increased 18 per cent to a total of $328,740. The net profit before interest charges was $63,923. Because of the company's inability to secure contract coal in sufficient quantities to keep its power house going it has been buying power manufactured at the Acme plant of the Toledo Railways & Light Company in Toledo.

Boston Elevated Refused Lease.—The Board of Trustees of the Eastern Massachusetts Street Railway have refused to lease their lines in Chelsea and Revere to the Boston Elevated Railway. To lease the lines, in the opinion of the former, would further complicate the traffic situation between Boston and points north. If the Boston Elevated Railway operated the lines to Revere, the passengers concerned would have to pay the higher fare to Boston. The Eastern Massachusetts trustees suggest the construction of a joint terminal at Chelsea in connection with the train service in the tunnel, in order to do away with drawbridge delays. It has been proved that the East Boston tunnel capacity can be increased from 6,000 to 20,000 passengers per hour by the use of trains and the elimination of surface cars.

Receiver for Road at Alton.—Judge George E. English, Federal Judge for the Eastern District of Illinois, has appointed Fred E. Allen St. Louis, and W. H. Sawyer receivers for the Alton, Granite City & St. Louis Traction Company, East St. Louis, Ill., as the result of a petition filed by bondholders of the road. The interest coupons for the last two periods, which became due in August and February, are in default, according to the petition. The Alton, Granite City & St. Louis Traction Company operates between Alton and St. Louis, passing through Edwardsville, Mitchell, Woodriver, Eagle Park, Granite City and East St. Louis. Including connections, the road controls 62 miles of trackage. Mr. Sawyer is president of the railway, which is controlled by the East St. Louis & Suburban Company.

Huntington Road Will Resume.—The Huntington, (N. Y.) Traction Company has been granted a certificate of public convenience and necessity by the Public Service Commission for the Second District of New York for the operation of the former Huntington Railroad between Halesite and Melville, Long Island, a distance of about 7 miles. Operation of the trolley line will permit residents along its line to make connection with the Long Island Railroad. The commission has also approved assignment by William A. Dempsey, Brooklyn, of a franchise granted to him by the Huntington authorities. The former Huntington trolley line was dissolved. There was a hearing before Commissioner J. A. Kellogg in New York who holds that operation of the line is a public necessity. The commission also authorized the company to execute the necessary securities, the proceeds of which are for the construction and acquisition of the road.

Court to Pass on Rentals.—Judge William B. Lynn of the Superior Court of Pennsylvania has signed a writ of supersedas removing from the hands of the State Public Service Commission the case of the United Business Men's Association, Philadelphia, vs. the Philadelphia Rapid Transit Company. The association had complained to the commission against the payment by the P. R. T. of large rentals to the Union Traction Company and its other underlying companies. The commission recently dismissed the demurrers of the underlying companies and ordered them to defend the action. The commission is now prevented from taking further steps in the matter until after a hearing by the Superior Court. Mayor Moore recently signed an ordinance for an appropriation of $50,000, which will enable the city to make a valuation of the P. R. T. system. This fund will be used for the employment of engineers, accountants, assistants and advisers.

Purchase of Bluefield Line Discussed. The directors of the Chamber of Commerce of Bluefield, W. Va., have endorsed and agreed to promote a plan of the Princeton Power Company to take over the electric railway system of the Appalachian Power Company in Bluefield, W. Va., and Graham, Va., and own and operate it in the future. Details of the plan have been worked out which are acceptable to both of the companies involved, and it now remains only for the people to support the proposition morally and financially to the extent necessary to put the deal through. S. J. Evans, president of the Princeton Power Company, and S. P. Hardy, the treasurer, appeared before the directors of the chamber and stated that their company stood willing to assume the ownership and management providing the business men of the city would subscribe to $50,000 of preferred stock to provide funds to rehabilitate the present system. The directors of the Chamber of Commerce passed a resolution endorsing the plan and authorized the president, Edwin Mann, to appoint a committee of five to assist in the sale of the stock.

Dismantlement May Be Prevented.—There are prospects that the Charleston-Isle of Palms Traction Company's line may escape being dismantled and junked. The State Railroad Commission of South Carolina has decided to permit the company to charge 5 cents a mile. The order is based on an act of the Legislature of 1920. The request for the increase was a resolution adopted at a mass meeting in Charleston several days ago, urging the commission to grant the higher mileage charge. The railroad seemed to be indifferent to the outcome of the situation because the road was operating at a daily loss. Judge Smith recently issued an order for the road to be sold and the company liquidated. The case went before Judge Smith on an appeal from a ruling of the Railroad Commission which refused to allow the road to increase its fares, instituting a zone system. This was before the passage of the act of the 1920 Legislature making possible the 5 cent a mile limit for small lines. The court on Aug. 11 authorized the company to conform to the regulations of the commission for the safety of passengers and to pay $12,500 in interest to the Baltimore Trust Company for the year ended Aug. 15. The company must make a full and complete return of its business and affairs on or before July 15, 1921, or sooner, if so ordered by the court. On this return will depend the ultimate future of the concern, for if it does not show that with the increased rates which have just gone into effect the company is able to operate without a continuous loss and to meet its just obligations, Judge Smith will put into effect the provisions of his decree of June 29, the effect of which would be the cessation of operations and the sale of the property, according to the order of the court.

Traffic and Transportation

Fare Order Brings Strike

Des Moines Men Plan to Ignore Court Because Dissatisfied with Terms of Rate Advance

Announcement of a walkout of the employees of the Des Moines (Ia.) City Railway to take effect at 1:15 on Aug. 24 was made on Aug. 23 by officials of the men's union.

This action toward a strike follows dissatisfaction of the men over the fact that in his order granting the receivers the right to place the fare in Des Moines temporarily at 6 cents and to pay an increased current wage to the men, Judge Martin J. Wade of the Federal Court made no definite order as to the back wages. The men claim an increase from 60 to 70 cents maximum from March 1, the date the arbitration board awarded an increase to the men.

Rate Increase Temporary

Judge Wade's order granting the increase in fare was made on Aug. 21. It went into effect on Aug. 22 at 5 o'clock. While not writing it into the order, Judge Wade intimated that the new rate was to extend over a period of from sixty to ninety days and that by that time the solution to the problems of fare in Des Moines might be found.

The fares fixed by Judge Wade are as follows: adults, 6 cents; children and school children, 3 cents; owl fares, 10 cents; Valley Junction, Fort Des Moines and Urbandale lines (where an additional fare of 5 cents has been collected when the cars passed the city limits) an additional fare of 4 cents.

Judge Wade further ordered that for the convenience of the public tickets were to be placed on sale at the company's office at four for 24 cents.

Earlier in the week action was started in the Des Moines City Council to grant the company a rate of 7 cents for a period of ninety days. The corporation counsel and the special counsel, however, fought the move on the grounds that it would prejudice the city's power to reduce the rate at the end of the temporary term. The resolution in the City Council was lost by a vote of three to two. The deciding vote was cast by the union labor member of the Council who had been considered to be the member strongest for the increased fare.

Judge Acts to Preserve Service

In his order Judge Wade said:

Of course no one connected with the proceedings claims that service can be continued at a 5-cent fare. I will not, however, undertake to determine what fare shall be paid as a permanent matter. I shall only undertake to act on this emergency so that for a short period of time the people of Des Moines will have street car service.

A strike has been suggested. Of course the men have the legal right to strike, but I have no hesitation in saying that they have no moral right to strike during the period of the State fair which would result in punishing hundreds and thousands of people who do not live in Des Moines and who are utterly innocent of any wrong with regard to the controversy about rates and wages.

I shall not undertake to enjoin a strike. I am making a temporary order which I trust will be the beginning of a permanent settlement. This order will give some relief to the employees and I trust will lead to the ultimate settlement of all matters in controversy.

It is only fair to the men and to the people of Des Moines to say that if after this order there is a strike the court will feel that it is its duty to cancel the wage contracts between the company and its employees. The receivers will be instructed to operate the cars if they can secure enough men to do so. If they cannot the receivers will be instructed to cease operation entirely until men can be procured to render service.

If at the end of sixty to ninety days the city and receivers have not settled the controversy Judge Wade announced that he would appoint a commission to fix fares which will be paid under future court orders.

The present week was settled upon by the men as a strategic week for a strike by reason of the fact that it is the time set for the Iowa State fair which brings several hundred thousands of visitors to Des Moines. The strike vote was taken some time ago by the men with Aug. 25 named as the last date for settlement.

Judge Wade promptly ordered the receivers to suspend service indefinitely and keep the cars in the carhouses and only to employ sufficient men to guard the property. The court also canceled all wage agreements and specifically ordered that no re-employment contracts be entered into with the men without the court's consent.

Seven-Cent Fare Appears Insufficient

Intimation has been made that the Connecticut Company may ask a higher fare of the Public Utilities Commission at the hearing to be held Oct. 1, when the test period under the present system ends. Leonard M. Daggett, one of the trustees of the company, in an interview is reported to have stated that the 7-cent fare is producing more revenue than the preceding zone system, but that the increased income is not sufficient to meet the expenses of operating the system.

In authorizing the present flat 7-cent fare system, which began on Aug. 8, the Public Utilities Commission set Oct. 1 as the date for a resumption of the hearing on the Connecticut Company's financial condition. On that date the Connecticut Company is to submit a report of the operation of the 7-cent system during the two months, and whatever recommendations it may have for the future.

R. I. Buses Quit

Company Placed in Receiver's Hands Pending Reorganization—Poor Management Alleged

Service has been temporarily discontinued by the Rhode Island Omnibus Company, Providence, R. I., because of lack of funds. The company, which has been operating in competition with the Rhode Island Company for about a year, has been placed in the hands of a receiver by agreement of all parties at interest. It is said that the company's assets are greater than its liabilities. An attempt is to be made to secure additional capital for the enterprise, which is claimed to have been run on a profitable basis up to the past few months.

Attachments Placed on Buses

William Law, one of the chief creditors in the concern, has been appointed temporary receiver. In asking for a receiver the creditors set forth that many persons had placed attachments upon the property of the corporation and that other creditors had threatened to do likewise. The naming of a receiver was deemed advisable for the preservation of the assets and for the best interest of all parties concerned in the venture.

Twenty-one buses are owned by the company. At a recent meeting of the creditors it was stated that the liabilities amounted to $7,764. The concern is capitalized at $51,000, of which Abraham Luff and J. C. Doran, former president, own $25,000 each. Mr. Doran put in $23,000 in cash while Mr. Luff is said to have $28,000 invested. An attempt is to be made to secure $15,000 in additional capital through stock subscriptions from the communities served by the company to permit the resumption of service.

Poor Management Charged

Poor judgment in the management of the affairs of the company is given as the chief reason for the company's difficulties. Unsuccessful experiments cost several thousand dollars.

J. C. Semonoff, counsel for the company, recently made the following statement outlining the reasons for the corporation's temporary embarrassment:

For various reasons the Rhode Island Omnibus Company has decided to discontinue business temporarily until the reorganization of the affairs of the company can be effected. The company has made the mistake of trying several experiments which have proved to be failures, and these experiments, together with the fact that there has been lack of harmony among the directors as to the methods of management, have been responsible for the present situation.

The company has operated very successfully, doing a good business with substantial profits until recently. At the present time, its assets, allowing for a reasonable depreciation, are understood to be in excess of its liabilities. From the experience gained the owners of the company are confident that with sufficient capital and with the proper management, the business will be so organized as to be very successful.

The public has greatly appreciated the service given by the company, and the residents of the suburbs, who have particularly profited by the service rendered, are understood to be making arrangements to do their part toward restoring the company to a sound basis.

Bridgeport Transportation Committee Reports

Open Meeting Monday to Consider Report and Its Recommendations—Admits Jitney Service Inadequate

Recommendations that the jitneys be barred from the central portions of the city of Bridgeport, Conn., giving the trolleys full right of way on Fairfield Avenue and State Street, from Water Street to Park Avenue, and the business section of Main Street, are contained in the report filed on Aug. 25, by Mayor Wilson's transportation investigation commission. Mayor Wilson has called a public meeting for Aug. 30. The members of the Board of Aldermen will be in attendance. In the report, the Connecticut Company is advised to take prompt steps to exercise its franchise by resuming operating of cars. The city is also urged to take legal action accorded it by the state laws to insist on a resumption of service or abandonment of franchise if the company fails to operate within a reasonable time. The city is further urged to use every effort to have the State Legislature grant permission to the Connecticut Company to operate motor buses. A further study will be made of the fare matter.

THE lines of the Connecticut Company embraced in the report cover 104 miles of track and include what the committee recommends be considered as the Bridgeport district. The first part of the report is given up to a review of the need of Bridgeport for adequate transportation and to a summary of the early financial history of the companies now included in the system of the Connecticut Company in and around Bridgeport. The commission lays very largely to the automobile the failure of the state-wide system represented by the Connecticut Company to meet its expenses, rentals and taxes.

On the matter of the frequently suggested plan for the segregation of the Bridgeport lines from the rest of the system, the commission says that "it is indisputably proper that each community represented by such towns as Bridgeport and its suburbs should be considered and administered apart from alliance with the rest of the State and its transportation salvation should be had with respect only to its own problems."

Reference is made to the valuation of the lines in Bridgeport made in 1910 by Westinghouse, Church, Kerr & Company. As of 1919 the valuation is $9,367,518 based upon unit values suggested by the engineers, with additions entered at cost at the time of purchase. The commission says that "if replacement values as of 1919 were to be used the total value would be about doubled," but that "it is not proper that increment in value under present inflated costs should be used." The figures mentioned are considered by the commission to represent a basis of valuation believed satisfactory to all.

The commission says that it must be conceded that the increases in the item "conducting transportation," which includes the wages of trainmen, are not excessive and were necessary.

On the question of fares the commission says:

> There are possible combinations of fare with transfer charges, and other combinations, but the correct combination to enact is the one that will yield the greatest number of passengers per car-mile possible, within the economic fare range. These details require several weeks of additional study before conclusive recommendations can be made. We cannot treat the problem as one merely of raising sufficient returns to keep the lines solvent and pay interest upon investments, because a combination of high fares and small travel which might do this, will not furnish the city with a proper service.

A resident vice-president and general manager for Bridgeport lines of the company is recommended, the incumbent to be a man who will identify himself with the city as a citizen interested in the growth of the city. The local manager should be "limited in authority only as necessary for coordination."

More safety cars are recommended. The report says:

> While now possessing excellent and sufficient number of cars, at earliest possible date the number of modern safety cars should be increased from the present number of forty-six to the number required for the full service on lines where this type of car has been found desirable, approximately thirty more such cars being required. It is believed that this addition can be deferred until 1921, at which time the city, or Bridgeport interests, might well underwrite a trust fund for the purpose. Further large outlays appear unnecessary for several years.

The commission would have the Connecticut Company prepared to enter the bus business. On this point it says:

> At the coming session of the Legislature the city should use its influence to secure passage of an act, if necessary, providing the Connecticut Company with authority for operation of rubber-tired motor buses in service complementary to its rail service. Such power should be made subject to full municipal control as to standards of vehicle, service and fares, and similar control in every phase should also be made effective concerning all public motor buses following specific routes.

It is the view of the commission that prior to the suspension of the railway, there were unfair elements in the competition between the trolleys and the buses, resulting in some degree in the inability of the railway successfully to operate its cars as contemplated under the railway's franchise; but, says the commission, "at the same time it seems proper to say that to take action that would virtually suppress responsible motor bus service in the city would hamper the line of progress toward better things in future transportation." Further, the commission says that it is of the opinion that "a properly organized bus corporation, surrounded by control, can meet with entire satisfaction, all the transportation requirements of the district."

A CONDITION; NOT A THEORY

While it is deplored that the railway thought it advisable, or was able under the law, to discontinue its passenger service on Aug. 2 and that the city was without adequate means to control the situation, the commission is mindful of the fact that "we are dealing with a condition and not a theory." The commission says:

> It is to be expected that the railway will voluntarily, or by necessity, resume, but should the railway fail now, upon further demand to restore its service immediately under the system of fares legally provided, it seems proper that the city should initiate such action as may under the law be done, for requiring such restoration, or sacrifice of franchises and should thenceforth proceed to lend its aid and encouragement to the organization of a modern standard motor bus company.
>
> It is believed that the failure of the present system of bus service fully to meet the requirements is due to the fact that operation is voluntary by individuals and lacks the possibility of control that may be exercised over an enfranchised body.

In conclusion the commission says:

> To this end it is recommended that a local permanent transportation commission for the city be appointed and legislative action be sought at the coing session under which such commission shall be recognized as a medium and clearing house for intercourse, reports, and regulation between the railway, or bus operators, and city. Thus, a permanent body of men will be provided through medium of which fare adjustments and service matters may be handled with better degree of preparedness, protecting both public and the companies in all situations that arise.

The rates outlined in the program of the commission would eliminate the motor buses from Main Street, south of E. Washington Avenue, and Fairfield Avenue between the Plaza and Park Avenue, and from State Street between Water Street and Park Avenue, and from portions of Stratford Avenue, Noble Avenue and Barnum Avenue.

A draft of an ordinance which would bar buses from many central streets of New Haven was submitted to the Board of Aldermen at its special meeting on Aug. 26 by the Aldermanic committee. The report is a short one and recommends the enactment of an ordinance laying down the street from which public service autos would be barred. A fine of $100 would be imposed for every violation of the provisions of the ordinance.

STATEMENT OF OPERATING EXPENSES OF CONNECTICUT COMPANY IN BRIDGEPORT DISTRICT FOR THE PAST FOUR YEARS

Expenses:	Year Ended Dec. 31, 1916	Year Ended Dec. 31, 1917	Year Ended Dec. 31, 1918	Year Ended Dec. 31, 1919	6 Mos. Ended June 30, 1920
Maintenance of way	$258,657	$270,193	$160,213	$205,528	$123,558
Maintenance of equipment	100,539	137,815	191,055	171,678	105,824
Cost of power	185,807	247,934	354,547	438,532	199,534
Conducting transportation	501,994	558,583	598,385	762,344	439,635
Traffic expenses	1,743	1,273	2,163	5,188	2,980
General and miscellaneous, including accident and insurance	153,017	175,629	181,350	238,361	122,314
Taxes	77,214	76,441	70,342	77,498	36,960
Return on property value at 7 per cent	655,726	655,726	655,726	655,726	327,863
Total costs	$1,934,701	$2,123,598	$2,213,783	$2,554,858	$1,358,671

California Commission Takes Lead

Grants Pacific Electric Railway and Other Lines a 20 per Cent Rate Increase, Co-operating with Interstate Commerce Commission

Announcing a policy of co-operation with the Interstate Commerce Commission, the California Railroad Commission has issued a decision authorizing steam railroads, electric interurban railroads and boat lines operating in California to increase both passenger and freight rates in conformity with the decision of the Interstate Commerce Commission. Under this decision the Pacific Electric Railway, Los Angeles, is authorized to increase all rates by not to exceed 20 per cent, which means that the company's local fares in Los Angeles and outside cities may be raised from a 5-cent to a 6-cent basis. All other interurban electric railways in California have heretofore been allowed, under decisions of the commission, to increase their local fares and therefore this increase will not be effective as to these lines.

THE action of the commission follows the application made by the carriers and hearings held by the commission in both San Francisco and Los Angeles, following the decision of the Interstate Commerce Commission. The Railroad Commission states in its decision that it is confronted with two alternatives: that either it must base its conclusion on the conditions in California alone, regardless of the fact that the income produced by the rates thus fixed would have been contrary to the action of the Interstate Commerce Commission, or it must proceed in harmony with the decision of that commission. The decision goes on to say:

We have given this matter very careful consideration, and in so doing have attempted to give weight to the probable consequences of proceeding upon either of these alternatives. We realize that without requiring more evidence that is now before us in this proceeding, to impose on intrastate business the identical percentage authorized by the Interstate Commerce Commission would, in effect, be the fixing through us of all State rates by the Interstate Commerce Commission. Whether or not this constitutionally may be done is a question we do not consider it our function to decide.

On the other hand, to proceed in the usual manner as though this were an entirely independent proceeding would result in serious delay, as it is evident that to gather and submit technical data upon which to base sound judgment of what practically all transportation rates in California ought to be, would require many months, and all possibility of immediate relief to the carriers would disappear.

Would Avoid Friction

This, however, is not the most serious result that would follow independent action by this State. If this commission, under the circumstances that now confront us, fixes State rates regardless of the order of the Interstate Commerce Commission, and if such rate fixing resulted in a return to the railroads of the Mountain Pacific group less than the 6 per cent authorized by the Interstate Commerce Commission, either the Interstate Commerce Commission must further burden interstate commerce with rates high enough to make up the deficit resulting from the California action or, if legally possible the Interstate Commerce Commission would be compelled to overrule this commission, or the Esch-Cummins Act would be a demonstrated failure.

It appears to us that if each State in a given group insists upon wholly independent action and judgment the whole spirit and purpose of the Esch-Cummins Act is in danger of nullification. It must be realized that the Interstate Commerce Commission, a national body entitled to the respect and confidence of the country acting under the mandate of Congress, has proceeded impartially, using the best available information and the best judgment of its members in the determination reflected in the order referred to. It has evidently in good faith sought to carry out the mandate of Congress.

It is our deliberate judgment that it is the duty of this commission to co-operate in every feasible way to give the Esch-Cummins Act a fair trial.

The commission makes it clear in its decision that it in no way abdicates its function in rate fixing as it states its determination to grant the prayer of the carriers is sustainable on the ground of reasonableness. Shippers who appeared before the commission at the hearings practically without exception stated their conviction that the roads must have relief in increased rates in order to be able to continue functioning and that it was their belief that the commission should co-operate with the Interstate Commerce Commission in making the increases effective.

The Pacific Electric Railway some time ago applied to the commission for a general increase in fare over its entire system amounting to approximately 33⅓ per cent. The commission was asked to conduct a thorough investigation of the company's affairs with a view to fixing a valuation upon which permanent rates might be fixed. Several hearings have been held on this petition, which is still in the commission's hands.

Seven-Cent Fare for Rochester Approved

The Public Service Commission for the Second District of New York on Aug. 24 authorized the New York State Railways to charge a 7-cent fare in Rochester on one day's notice to the public.

On Aug. 5 the New York State Railways presented evidence to the Public Service Commission, upon its application for authority to charge a 7-cent fare in Rochester under amendment of the Rochester franchise which was the subject of litigation through the Court of Appeals in the Quinby case.

The proceeding on Aug. 5 was under a waiver by the Rochester authorities of the railway's franchise agreement and a stipulation in the Quinby case permitting the commission to pass on the company's petition for right to charge a 7-cent fare under agreement with the Rochester Common Council and Mayor.

A statement was introduced in evidence showing that in May and June the operating revenues on the Rochester lines totaled $743,522, the operating expenses $802,433, and taxes $50,820, leaving a deficit in income of $110,107.

Chairman Hill brought up the question of service in Rochester which it was shown at a prior investigation by Commissioner Barhite was not efficient. He asked the company to submit evidence as to improved service under the proposed new fare.

James F. Hamilton, president of the railway, said there had been an improvement since the commission's investigation, and schedules of operation are now being prepared which will insure better service. These will go into effect in thirty days under the increased fare. He said details of the proposed improved service would be submitted to the commission.

Mr. Barnes said it was planned to give a service in Rochester which would be beyond criticism. Travel will be closely watched for improving service in the future.

Mr. Pierce stipulated in the present proceedings that the value of the company's property used on the Rochester lines was $17,500,000.

The 7-cent fare now allowed is the initial rate fixed under the terms of the new service-at-cost contract under which the lines of the New York State Railways in Rochester will be operated in the future.

Massachusetts Road Gives Up Freight Service

Freight service was discontinued by the Eastern Massachusetts Street Railway on June 16. It has been unprofitable. On paper it appeared that the company was breaking even, but figuring the wear and tear on equipment and tracks and the interruption of passenger service at a time when the agitation for better passenger service was at its height, it was deemed best to discontinue the service.

Another obstacle was the large number of bridges to be crossed on the various lines of the company. The capacity of most of these bridges was insufficient for the weight of their freight cars which had a capacity of 60,000 pounds.

In addition to all this the company was confronted with the purchasing of snow fighting equipment or the converting of some of its present equipment into snow plows, etc., and it was decided to convert the forty freight cars into equipment for keeping the lines open this coming winter.

The men formerly employed in this branch have gone into the passenger service and retained their rating. Some of the men with low ratings have left the company, but the majority are satisfied with their ratings in the passenger service.

As to the executives, Frank D. Ward, formerly superintendent of rolling stock, has accepted a position with the Robert Dollar Company, New York, as construction engineer and has departed for Shanghai, China. On his departure Walter C. Bolt, formerly purchasing agent, was made superintendent of rolling stock, and Perley P. Crafts, formerly manager of the freight department, became purchasing agent.

Asks Indefinite Rise

Los Angeles Railway Applies to State Railroad Commission for Rate to Yield Just Return

Application for an increase in fare was filed with the State Railroad Commission by the Los Angeles (Cal.) Railway on Aug. 20. The present rate is 5 cents. The application does not ask for a specific increase but asks that the commission "make such order, granting authority to the applicant to increase the rate of fare as will afford the applicant sufficient revenue to pay the cost of the transportation service which it renders the public." In this way it is left to the commission to decide what increased revenue the company must have to meet present obligations, and those of the future which the commission can foresee.

The commission is asked to resume the investigation of the Los Angeles Railway which it made last year and which led up to the rerouting of many lines and introduction of safety car service. It is pointed out in the application that while the last survey showed where economies could be effected, new factors which the commission could not then foresee have arisen and increased expense has more than wiped out the savings resulting from these economies.

It is stated that the cost of power has increased 27 per cent since the last survey was made and that it has been necessary to raise wages practically $990,000 since Jan. 1, 1920. Prices of nearly all materials have been advanced substantially, the application states, and will be materially increased again by the rise in the interstate freight rates.

The application of the Los Angeles Railway follows the award of a 20 per cent increase to the Pacific Electric Railway, which operates interurban service out of Los Angeles and local service throughout the Hollywood district. The commission awarded the Pacific Electric a temporary 6-cent local fare and will make an investigation before announcing a permanent increase.

Still Fighting Kansas City Buses

Continuing its fight for the extermination of jitney competition with its electric lines, the Kansas City (Mo.) Railways is publishing from week to week in the *Railwayan* articles dealing with various aspects of the local railway situation in which it points out that bus traffic on the present scale makes the difference between profit and loss to the company. In a recent issue the company said:

Jitneys are taking away from this company approximately $3,000 per day in revenues. As against 11,828,364 revenue passengers carried in June, 1917, the company in June, 1920, carried 10,656,374. In June of last year 580 cars were operated in the evening rush. Today 662 are operated, or an increase of 82 cars, or 14 per cent. Due to the system of turn-backs on through lines and because of the increase in scheduled speed, each car is today giving much more service than it gave a year ago. In other words, as against 580 cars in June, 1919, 700 are being run today on the same basis, showing an increase of 20 per cent in service.

Assuming that jitneys are making expenses and some profit, and this assumption must be correct or these individual would not continue in the business, the fact remains that transportation in Kansas City both for jitney and railway passengers is being furnished at a loss of $3,000 per day. In other words, the investors in the Kansas City Railways are paying this amount daily in order to support the operation of jitneys. The unfairness and injustice of this is so apparent that we do not believe it can long continue in a city where fair play and the square deal is the basis of its industrial life, as is the cass in Kansas City.

It is a situation that cannot continue indefinitely and which in the end must result either in the removal of jitney competition or in some readjustment of service and fares that will permit this company to exist. No one for a moment believes that Kansas City's transportation could be adequately furnished by a haphazard system of jitneys. The withdrawal of street railway service in the outlying portions of the city would result in deteriorating the value of property and homes millions of dollars.

The Kansas City Jitney Men's Association is investigating various types of motor buses with a view to standardizing vehicles used in bus traffic. The association aims to make the bus the chief means of surface transportation in Kansas City. As soon as the association has made its selection it plans to replace vehicles now in use with those of standardized type. It is reported that the investigators favor a double-deck, steam-driven bus seating fifty persons.

Transportation News Notes

Seven Cents in Winnipeg.—The Winnipeg (Man.) Electric Railway has been allowed by the Manitoba Public Utilities Commission to advance its fares to 7 cents, effective Sept. 1. Labor tickets are ordered abolished. The company was granted an increase of 25 per cent in gas rates, after an eighteen month struggle, which places it on a sound economic basis. The city is appealing the case. The company is now charging a 6-cent fare.

Interurban Raises City Fare.—Permission has been granted by the Wisconsin Railroad Commission to the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., under an order issued August 19, to increase the rate of fare on its line within the city of Milwaukee from 5 cents to 6 cents. The company gave the increased cost of coal and labor as the chief reasons for seeking an increase in fare. The higher rate was not opposed by the city authorities of Milwaukee, and has already become effective.

Ticket Withdrawal Meets Protest.—A petition signed by 1,000 residents of Winthrop, Mass., was filed with the State Department of Public Utilities as a protest against the elimination of reduced rate tickets on the Boston, Revere Beach & Lynn Railroad's narrow gage line. Under recent order the department reduced the fare from Boston to Lynn from 20 cents to 10 cents, allowed the single fare of 10 cents to Winthrop to stand and abolished the commutation tickets formerly sold at the rate of ten rides for 85 cents.

Memphis Rise Takes Effect.—A cash fare of 7 cents took effect on the lines of the Memphis (Tenn.) Street Railway on Aug. 18. The new rate had previously been approved by Judge Cochran of the United States District Court. Based on the report of the receivers for the month of July, the increase in the fare will bring to the railway an additional revenue of approximately $29,000 a month. T. H. Tutwiler, one of the receivers of the company, stated recently that the sale of tickets would result in a net increase in the rate of fare of between six-tenths and seven-tenths of a cent. The July report shows a deficit of more than $17,000 under the 6-cent fare, which, according to the receivers, indicates that even under the new rate the report for August will not show a surplus above the cost of operating expenses.

Commutation Rates Increased.—The Rochester & Syracuse Railroad, under a tariff which it has filed with the Public Service Commission for the Second District of New York, effective on Sept. 6, will increase its rates for fifty-trip commutation and fifty-trip school commutation books for travel between the Rochester city line and the Syracuse city line and intermediate points from 1.5 cents to 2 cents a mile, minimum rate increased from $6 to $7 a book. Other changes proposed are: mileage books of 300 miles increased from $7.50 to $8.25 a book. Twenty-five strip book good between Rochester city line and East Rochester, increased from $2 to $2.50, and between the city line and stops 11 and 12 from $2.40 to $2.90 a book. Increases will also be made for carrying newspapers from 25 cents to 50 cents a hundred weight and for chartered cars.

Six-Cent Measure Passed.—A new franchise permitting the Ohio Valley Electric Railway, Huntington, W. Va., to raise the fare in the city to 6 cents was passed unanimously over the Mayor's veto on Aug. 13 by the City Council of Ironton, Ohio. Whether or not the decision will affect the situation in Huntington is uncertain. The Councilmen had investigated the fares of various cities before taking final action, and were of the opinion that the increase was just and reasonable. W. R. Power, general manager, stated some time ago that the company had taken up with the Huntington officials an increase in rates and that in the near future a petition would be filed with the Interstate Commerce Commission, at Washington, requesting permission to advance the fare. The petition has not yet been filed. The fare increase on the Ironton lines met with no opposition from the public or the press. The *Irontonian* commented favorably on the Council's action.

Personal Mention

F. L. Butler Steps Up

Becomes Manager of the Winnipeg Electric Railway Under Reorganization Plan

Several changes of importance have been made in the official personnel of the Winnipeg (Man.) Electric Railway. These changes have for their purpose the effecting of a more compact organization, in which the various departments are co-ordinated under the direction of A. W. McLimont as vice-president. This arrangement relieves Mr. McLimont of the more direct operating duties, enabling him to give his time more fully to administrative matters.

Frank L. Butler, heretofore general superintendent, becomes manager of the system. In this capacity Mr. Butler will have complete charge of the operation and maintenance of the company's railway, light, power and gas properties and also of the subsidiary companies, the Suburban Rapid Transit Company and the Winnipeg, Selkirk & Lake Winnipeg Railway.



F. L. BUTLER

W. E. Blodgett has been appointed comptroller of the company in charge of all accounting matters. Mr. Blodgett has been serving as secretary-treasurer of the Utah Light & Traction Company, Salt Lake City, Utah. He succeeds A. R. Ross, resigned.

W. F. Edwards, traffic instructor, has been promoted to traffic superintendent. Mr. Edwards succeeds A. MacDonald, who has resigned because of ill health and has returned to Montreal.

An experience of more than twenty-five years in the operation of public service companies in the United States and Canada makes Mr. Butler well qualified for his new position. He began his career in 1894, when he entered the service of the Vandalia Railroad, now a part of the Pennsylvania Railroad lines. He remained with that company in various capacities and at various points until 1909, when he resigned to become superintendent of the Denver & Inter-Mountain Railway, Denver, Colo. Later he was promoted to the position of vice-president and general manager of that property. He resigned on Sept. 1, 1911, to accept the position of general manager of the Alton, Jacksonville & Peoria Railway, which road was then under construction. Shortly thereafter he was appointed receiver of that railroad, and later completed the line as far as Jerseyville, Ill. In July, 1913, Mr. Butler was appointed general manager of the Chicago & West Towns Railway and the Suburban Railway, with headquarters in Chicago, Ill., and remained in charge of that property until April 1, 1918, when he accepted the position of general superintendent of the Winnipeg Electric Railway.

Mr. Schreiber, Division Manager

The Public Service Railway, Newark, N. J., announces changes for the Southern Division. William B. Graham, whose position as division superintendent will be abolished, will be transferred to a position on the general superintendent's staff at Newark. The new manager of the Southern Division will be Martin Schreiber, the present chief engineer of the railway. Robert A. McArthur will be superintendent of transportation for the Southern Division and John T. Torbert and William G. Scheiner will be made assistant superintendents. William Matlack will be supervisor. James M. Symington will be transferred from Camden to succeed Mr. McArthur at Newark.

William H. Wright will be given the title of superintendent of distribution, while J. Walter Wright will be made superintendent of maintenance of way. John Hanf will be master mechanic instead of division master mechanic. The changes will go into effect on Sept. 1. The Southern Division comprises the territory around Camden.

F. P. Edinger has been appointed superintendent of transportation of the Chicago (Ill.) Surface Lines. Mr. Edinger has been serving as acting superintendent of transportation since last February, when Henry A. Blair took control of the company's affairs as president. Mr. Edinger has been with the transportation department of the Chicago Railways and its subsidiaries since 1893. He began his career as a conductor and, working up through the transportation department, became superintendent of one of the North Side districts. In 1914, at the time of the unification of the Surface Lines, he was placed in charge of the Sixth division.

W. F. Collins at Rochester

Announcement Made of Appointment of Transportation Engineer Under Service-at-Cost Grant

Plans are rapidly being developed to put into effect all the conditions sought to be imposed under the new service-at-cost franchise under which the New York State Railways, Rochester Lines, will operate. One of the first moves by the city was the appointment of Charles R. Barnes as city street railway commissioner. Now comes the announcement of the appointment of the assistant to Mr. Barnes with the title of transportation engineer.

Willis F. Collins is the appointee. He is a young man who has been reared in an atmosphere of railroading, being the son of W. H. Collins, general manager of the Fonda, Johnstown & Gloversville Railroad. The natural aptitude of the younger Mr. Collins for things mechanical was rounded out by attendance at Rensselaer Polytechnic Institute, of which he is a graduate, and by varied experience in electrical and railway work obtained while in the service of the General Electric Company on construction and installation work.



W. F. COLLINS

From the engineering side Mr. Collins branched out into the problems of management of electric railways, starting in a minor capacity and advancing to be superintendent of transportation of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va. It was under the supervision of John N. Shannahan that the abolition of the physical properties of this company was carried out, and while the work of Mr. Collins had primarily to do with the railway operations of that company, still an opportunity was afforded to him for the collateral study of problems of the gas and electric industry, which a combined property such as that at Hampton affords. Mr. Collins has already left Hampton to enter upon his new duties.

Mr. Collins will be the right-hand man to Mr. Barnes. He will be responsible for keeping the railway commissioner informed as to operating conditions.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Lower Cotton Not Affecting Electrical Goods

Price of Raw Material Is Frequently a Small Factor in Ultimate Cost

Despite recent drops in the price of cotton electrical products containing this material have not yet generally declined in price. About the only drop of importance has been a considerable reduction about Aug. 15 in the price of some lines of cotton insulating tape and webbing. In general the reasons for the firmness are the excellent demand, the large number of unfilled back orders, the high labor cost and the fact that the price of cotton is a small part of the cost of finished products. Another reason is that the spinning mills still have some 40-cent cotton with which they are filling orders placed some time ago.

In the matter of cotton insulating tape, which is more directly dependent on the price of cotton than other electrical products, there was in some cases a notable drop in price about the middle of August.

The demand for cotton insulating tape is just ahead of the supply, though deliveries are not longer than one month. The thinner grades are harder to get as the fine yarns are scarce. Cotton-sleeving deliveries are made in two to six months. There is a very heavy demand for this material, which cannot be met by the mills because of a scarcity of sleeving machinery.

Friction tape is more plentiful than it has been for some time and immediate deliveries can usually be made. No changes in price are reported.

The fine yarns used on magnet wire are difficult to obtain; consequently there is some scarcity of this material and prices are firm. Stocks of non-metallic flexible conduit are in good shape and the demand is fair. Prices are holding firm.

Cloth manufacturers are hoping for still lower cotton, crop prospects are good and there is talk of heavy cancellations by tire manufacturers, who use an enormous amount of cotton fabrics, but in spite of these factors manufacturers of electrical material whose basis is cotton state that present prices will continue to hold firm for several months.

Strong Market for Steel Rails Abroad

Mills Are Already Well Booked Up and Electric Railways May Find Difficulty in Placing Orders for Future Needs

In view of the needed repairs to worn-out railway equipment that are now expected to be made as the result of the financial relief that has been granted to steam railroads, a heavier buying movement of steel rails is anticipated. This circumstance, in connection with the strongly increasing demand for rails that exists abroad, should more than take care of the output of domestic mills for some time to come, it is thought. In fact, few of the rail makers in the Pittsburgh district are taking any orders for shipments this year, as many of them have more than sufficient business booked for the remainder of the year and are practically out of the market.

Hence it seems logical to draw the conclusion that purchasing agents of electric railways who must enter the market for rails would do well to anticipate their needs long in advance so as not to be left in the lurch with their orders. The growing volume of rails exported is an especially important factor in the situation. The total figures of 553,860 gross tons of steel rails exported for the fiscal year ended June 30, 1920, do not compare very favorably with the total of 621,728 tons in 1919 it is true, but the increase in recent inquiries from abroad is significant.

The city of Glasgow, Scotland, a short time ago awarded a contract of 10,000 tons of steel rails at a total cost of about £250,000 to an American firm, and the offer of the latter was almost £4 10s. per ton lower than the best British bid. The price paid for the rails to the American firm, according to advices from abroad, was £24 10s. a ton. Egypt is also in the market for rails, and the surveyor general of that country has invited American firms to submit bids for immediate or future delivery, on same footing with British mills.

Italy is in dire need of grooved rails for the traction companies of her cities, as production there is wholly inadequate to cope with the demand, and the former sources of supply in Belgium, France and Germany are temporarily closed. As soon as the rate of exchange, which is now so heavily unfavorable to Italy, improves, a strong demand for American rails is expected to materialize there.

In the steam railroad field the state of Nigeria has bought 20,000 tons of rails which the United States government intended for use in France during the war, and 11,000 tons have also been purchased from the same source by the Swedish State Railways.

Nor is continental Europe the only active foreign market for rail production here, as South America is also showing great interest. One of the recent inquiries is from the Brazilian government, which is asking for bids here on 13,000 tons of 50-lb. rails.

Railway Motor Deliveries Excellent

Demand Continues Quiet, but Inquiries Are Active and Prices Holding Firm

Railway motor sales are running relatively low in volume at present, although the business being booked by some manufacturers appears to be somewhat above that of a year ago at this time. The safety car motor continues to rank as the season's "best seller," and interest in this standardized product grows with each passing month. Inquiries are received from a good many of the smaller operating companies, and if their financial needs were less acute there is no question that many more orders for these motors would be soon forthcoming from these companies. Notwithstanding recent price increases of 10 to 15 per cent that were announced by various leading makers of polyphase and direct-current motors, railway motor quotations are still holding steady at late levels. On account of difficulties recently experienced in securing raw materials, however, and fluctuating conditions that exist in manufacturing plants generally, it is cutomary in representative motor sales to present factory quotations only, but while these are being made up for each representative order booked in typical cases, there can be seen no disposition to mark up prices further at the present time.

Deliveries on safety car motors are being quoted now at about three months for the completion of the order, initial shipments beginning in from twenty-one to thirty days after the signing of the contract. Motors of larger size and varied type, such as are required in four-motor car equipments, are quoted about four weeks longer than the safety car outfits. The advantages of standardization and hence of mass production are thus

realized by the manufacturer and purchaser alike. The raw material situation is somewhat improved at present, chiefly as a result of the resumption of work in the brass and copper industry, following the end of unsuccessful labor agitation. Stocks of motors are running pretty low at present, and the "floating" reservoirs of motors maintained at car builders' plants are not up to previous levels. Very little spare part ordering is being handled at this time, but a good deal of this business is expected in the coming winter.

Electrical manufacturers are finding the completion of control equipment the chief difficulty in filling motor orders. The disturbed transportation conditions have upset the supply of numerous comparatively small parts and fittings, and labor troubles have played their part in delaying the completion of orders for such outfits. Some of the trolley systems in the medium-sized cities within fairly easy reach of the electrical factories are picking up financially, and there is good ground for optimism in regard to future business from roads which are getting on a better monetary basis. The further development of express car service should result in increased motor sales, notwithstanding the singular policy adopted by one large operating company of doing away with this branch of its transportation functions.

Small Prospect of Relief in Rigid Conduit Supply

Some Factories Forced to Close as Result of Car Shortage and Inability to Obtain Pipe

Reports received from the metropolitan territory on the rigid-conduit situation within the past couple of weeks may, according to representative manufacturers, give an erroneous impression of the true general market condition of this material. A curious situation exists in that while the supply of conduit for New York and certain points to the south has somewhat improved, the general situation throughout the rest of the country apparently shows little betterment. This is only natural when the true significance of the improved supply in these instances is understood.

According to representative manufacturers of conduit, the transportation situation as it affects them is very little, if any, better. Added to this circumstance is the dwindling supply of pipe that has for some time past been available for the manufacture of conduit. Steel mills attribute the shortage to their inability to get cars for shipping their product to the makers of conduit. One of the latter has received no pipe for a month and a half, and another manufacturer has received no recent supplies except by boat. As a result of this lack of raw material caused by the car shortage, one of the large makers of conduit has ceased production during the past two weeks and another company has not turned out any conduit in over a week.

Prior to this, however, stocks of finished conduit had accumulated at the mills awaiting cars to carry it away, but a system of embargoes that was placed upon producers in the Middle West made it very difficult to move their product. At one time a permit was even necessary to ship the material. Recently, however, the situation has been relieved to the extent that shipments can be made to certain territory in the East and some points southward in a little better shape, although the car shortage continues and the rest of the country remains almost as restricted in its supply as before. Consequently, with the outlet to their market restricted, conduit manufacturers have shipped their product in large quantities to the metropolitan district, creating a misleading impression that conduit is becoming very plentiful. This condition would seem to be but temporary, however, inasmuch as manufacturers say the unusual flow of conduit into the favored territory will cease as soon as freight conditions improve generally.

Regarding the general market for conduit over the country, no let-up in the insistent demand has as yet appeared, and in distant places like Cuba a condition of absolute famine prevails. New orders are accepted with no promise as to date of delivery and with price quoted in effect at time of shipment. Back orders have in some cases piled up sufficient to absorb production for nearly a year to come. The large labor turnover found among the many foreigners employed in this industry is a further source of inconvenience.

In spite of these factors, prices have generally remained firm, but some producers hold to the opinion that an advance may be necessary owing to the increased freight rates.

Demand for Bare Copper Wire Not Extra Heavy

Drawing Process and Shortage of Fuel and Cars Are Impeding Deliveries

Although raw copper is in an easy position and copper rods are plentiful, the supply of bare wire has suffered from unfavorable conditions of manufacture. Chief among the latter are insufficient supplies of fuel and a shortage of cars. Labor has also caused some concern, for though no strikes have been experienced recently it is reported that a certain indifferent attitude in the past has materially reduced the output of work per man. Some improvement in that respect is now noticed, however. Production is in most cases close to normal, although a few wire manufacturers report a subnormal output. The operation of drawing the wire seems to be causing some delay, as manufacturing facilities have not increased as did demand during the war. Consequently the finer sizes of copper wire are much the hardest to obtain.

ELECTRIC RAILWAY BUYING IS LIGHT

Demand at present is not exceptionally heavy, and in several quarters it is said to be slackening. Foreign demand is also decidedly off and seems likely to remain so until exchange rates improve. The increase in freight rates granted to steam railroads, however, is expected to result in large orders on their part, but this buying has not yet begun to materialize. Electric railways are not heavy purchasers of copper wire at present, nor have they been for some time past, because financial relief in the form of rate increases seems to be necessary before appreciable orders can be expected from that quarter. One of the reasons why bare copper wire has not been as plentiful as might be expected is the very large call which exists for insulated wire. This demand has been so great that much of the bare copper wire which would normally supply the market has been insulated to meet the demand which exists for the covered wire. Consequently, in order to safeguard their needs, some consumers largely overbought and pyramided their orders, with the result of eventually causing demand to slow up as is now happening. Some few cancellations are reported as the result of this inflation of orders.

Producers seem to be optimistic about the future volume of business, for transportation is easing up slightly and many new projects long held up by freight difficulties are expected to go forward. Some wire makers believe the price of copper, and hence of wire, must advance and not decrease, in view of the estimated increase of a cent per pound in the cost of transportation of copper. Still others hold that no price increase is possible until foreign demand once more makes itself strongly felt here. One of the leading producers is quoting copper wire on a 22½-cent base.

Deliveries are slightly improved. One of the largest buyers of copper wire, who was formerly unable to obtain supplies under six to ten weeks, is now securing deliveries in from ten days to three weeks. This is apparently not a representative case, however, as in general manufacturers are quoting about six to eight weeks' delivery.

Rolling Stock

Detroit United Railway, Detroit, Mich., states that its car construction program for the coming year contemplates the building of 150 new motor and trail cars, for which material is being ordered. This program is to be carried on independently of any cars which may be purchased from outside manufacturers. Several of the new motor cars will be of the Peter Witt center-entrance type. Since the be-

ginning of this year, 65 new motor and trail cars have been built by the company in its shops, and by Jan. 1, 1921, it is expected that at least 35 more cars will have been completed and added to the service, making a total of 100 or more new cars for the year.

Franchises

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has been granted a franchise for the construction of a single spur track connecting with the company's line in Santa Monica Boulevard, Los Angeles County.

Springfield (Mass.) Street Railway.—The Springfield Street Railway has been granted franchises for the building of its East Springfield-Indian Orchard extensions. New lines are to be laid from Liberty Street to Page Boulevard, and on Page Boulevard, from the turnout east of the Westinghouse plant to Berkshire Street. Relocations are provided on St. James Avenue. Several relocations are to be made, which call for the construction of long turnouts and considerable double-tracking.

Track and Roadway

Rhode Island Company, Providence, R. I.—The Rhode Island Company is laying new rails on its Oaklawn line beyond Meshanticut.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway is making plans for the building of a subway from the Hill Street station to Figueroa Street.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway is double-tracking its line in Boston Street, Lynn.

Pacific Electric Railway, Los Angles, Cal.—The Pacific Electric Railway proposes to construct an overhead trestle crossing its tracks at Atlantic Avenue and Newport Street, Long Beach.

Jacksonville (Fla.) Traction Company—The Jacksonville Traction Company proposes to build an electric railway extension in Monroe Street from Broad to Clay to connect with the Clay Street line.

Springfield (Mass.) Street Railway—The Springfield Street Railway has begun work on an electric railway extension in Carew Street, Springfield. The line will run through Carew Street from Chestnut Street, to connect with the company's Liberty Street line.

United Railroads of San Francisco, Cal.—The United Railroads is installing a loop at Fourth and Market Streets to permit a turnback service on the Market Street line. The Municipal Railway of San Francisco is making a similar installation.

Trade Notes

The American Welding Society now has a Chicago section, which was organized on Aug. 3 at the rooms of the Western Society of Engineers, in that city, where meetings will be held on the second Tuesday of each month.

The Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia, Pa., manufacturer of electrical measuring instruments, has purchased property totaling about three acres on Germantown Avenue, for the erection of a new plant. The consideration is stated to be about $35,000.

The Franklin Moore Company, Winsted, Conn., manufacturer of electric hoists, small electric cranes, etc., has appointed William C. Briggs vice-president in charge of manufacturing. Mr. Briggs was formerly sales engineer and New York manager for the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

The Lehigh Portland Cement Company, Allentown, Pa., has secured a tract of 450 acres on the outskirts of Birmingham, Ala., and announces the early building of a 1,000,000 barrel plant as the initial unit, at an estimated cost of $3,000,000. The location is contiguous to the Alabama By-Products Company, from which by-product gas will be used as fuel if found advantageous.

J. J. Costello, formerly sales engineer with James C. Barr, Boston, Mass., has established offices at 201 Devonshire Street, Boston, where he will represent the Lewis & Roth Corporation, Philadelphia, manufacturers of high-tension devices and power plant specialties, and will also handle the New England sales for the Cutter Company, Philadelphia, manufacturers of the I-T-E line of circuit breakers and other equipment.

A. E. Roberts, formerly vice-president and general manager of the Hedden Iron Construction Company, Newark, N. J., has been elected first vice-president of the Milliken Brothers Manufacturing Company, Woolworth Building, New York City, manufacturer of radio towers, transmission towers, fabricated all-steel buildings for electrical service, etc. He will be in charge of the New York office and direct all matters pertaining to sales.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has introduced an Insurance and Savings plan to which 90 per cent of its employees have subscribed. An employee after six months' service with the company is given a $500 life insurance policy free, and by depositing at least 2 per cent of his earnings in the Employee's Savings Fund, additional insurance of from $500 to $1,500 may be secured, depending upon the length of service. The savings fund pays 4½ per cent interest on all deposits.

The Black & Decker Manufacturing Company, Baltimore, Md., announces that it has sent a letter to all jobbers handling its line, stating that there will be no reduction in prices this year, and that, starting Jan. 1, 1921, the company will protect its jobbers against loss through price reductions for sixty days after the purchase of goods. The letter says, however that if conditions make a reduction possible, it will be made promptly so as to give the ultimate purchaser the benefit, and the company will absorb any loss which would otherwise be caused the jobber who bought within sixty days before the change in price.

The Sprague Electric Works, 527 West 34th St., New York, N. Y., has a new factory at Maspeth, L. I.. It is a two-story building of approximately 100,000 sq.ft. In addition there is a two-story structure containing about 12,000 sq.ft. which will be used for the New York district sales warehouse. Work is to be started at once on a warehouse containing about 19,000 sq. ft., and another small warehouse 100 ft. x 15 ft. for the storage of rigid conduit.

New Advertising Literature

Fuses.—E. W. Snow & Company, Rochester, N. Y., are circulatng catalog No. 15, covering their different types of inclosed electric fuses.

Instruments.—"A Few Simple Methods of D. C. Testing in Routine Practice" is the subject of bulletin No. 13, recently published by the Pyroelectric Instrument Company, 636 East State Street, Trenton, N. J.

Power Plant Devices.—The Yarnell-Waring Company Chestnut Hill, Philaphilphia, Pa., has issued folder No. G 1301, covering the Yarway devices for modern power plants, and booklet No. B 410, describing different types of the Yarway blow-off valves.

The Canton Culvert & Silo Company, Canton, Ohio, has just issued a new catalog on Acme Nestable Corrugated Culverts. Information regarding use and shipment is given, together with tables of the safe load in pounds per square foot.

Devices for Conduit Connections.—"Spraguelets" is the title of a small booklet issued by the Sprague Electric Company, New York City, covering its Spraguelet devices for conduit connections. The company is also distributing a booklet entitled "The Universal Key," "a cross-reference for matching any standard wiring device to any desired box and cover."

Gages.—The Schaeffer & Budenberg Manufacturing Company, Brooklyn, N. Y., has issued catalog sections No. 1, 50 and 75, covering its pressure, vacuum and draft, gages and gage testers; also a preliminary bulletin describing its hand and stationary tachometers.

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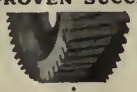


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DETECTIVES
Street Railway Inspection
131 State St. BOSTON

Scofield Engineering Co.
POWER STATIONS
HYDRAULIC DEVELOPMENTS
Consulting Engineers
PHILADELPHIA, PA.
GAS WORKS
ELECTRIC RAILWAYS

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Increased Traction Rates—The Only Guarantee of Traction Development



THE advertisement published herewith will appear in the *Saturday Evening Post, Literary Digest, Factory, System, and Manufacturers Record.*

It will be read by millions of people whose intercourse depends largely on efficient traction operation.

Habirshaw advertising, directed by its broad, co-operative policy, is characterized by its treatment of industrial situations in the electrical world. Now it is wielded to assist the traction companies in their need for increased rates to make the investment profitable and enable them to improve and extend lines to meet the ever-increasing demands of urban and suburban life.

Habirshaw is endeavoring to build public confidence in the traction interests by expressing the simple story of their faithful, enduring service, their vital importance to humanity, the courage and vision of traction executives.

Habirshaw believes that this is the surest way to gain public acceptance of increased fares yielding an adequate return on invested effort and funds.

Habirshaw Wire Manufactured by
Habirshaw Electric Cable Co.
Incorporated
10 East 43rd Street, New York



Habirshaw Wire Distributed by
Western Electric Company
Incorporated
Offices in All Principal Cities

HABIRSHAW

"Proven by the test of time"

Insulated Wire & Cable



In the construction of new road-bed, an important factor to be considered is

Resiliency

A resilient road-bed is not only less noisy and more easy riding, but lessens wear and tear on equipment.

Dayton mechanical ties afford this resiliency so important in modern track construction. A cushion of asphalt is the shock absorbing medium. Result—Resiliency.

Build your track with no comeback.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO



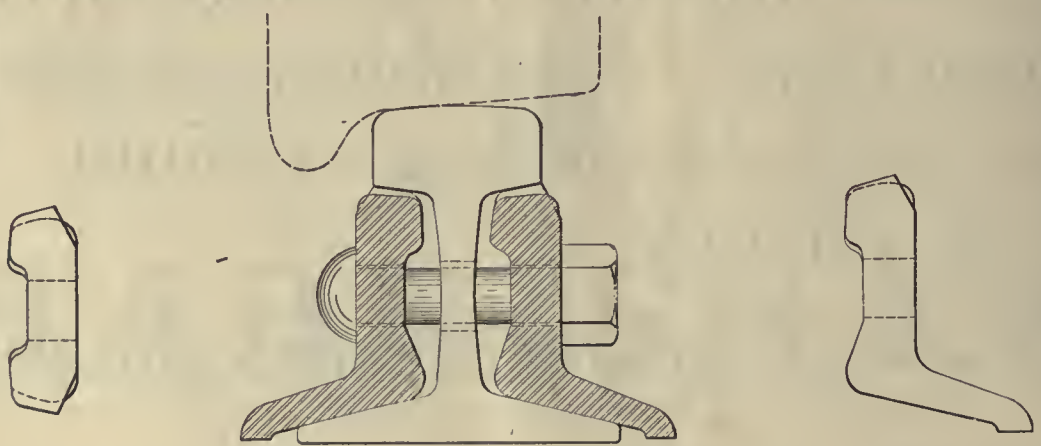
Here's a practical comparison that explains the greater strength of rail joints made with

Lackawanna

Safety-head Angle Bars

What do you do when you wish to break a rail in the field? Quite probably you will resort to the time honored practice of nicking the rail with a cold chisel and then dropping it—because you know that once the surface skin is impaired the rest of the rail section breaks easily.

The same line of reasoning applies to the angle bars in a rail joint. With the ordinary angle bars, as the wheel load passes over the joint, the ends of the rail are deflected and the sharp under corners of the rail heads bear upon and cut into the head of the angle bar. Added to this action is the longitudinal motion of the rails caused by the wave motion in the track and by contraction and expansion. The latter action produces the upset at the center of an ordinary bar, as shown in the illustration on opposite page. When the load passes the joint and straddles the center of the bar the thrust is upward, and the tension comes at the center of the splice bar at the top, where the wear has occurred. Isn't it logical that this stress will ultimately break the angle bars at this weakened spot? You have the answer in the fact that the bars *do* break here—a serious condition which you have undoubtedly found from your own experience and which you can confirm by the experience of other trackmen.



The Lackawanna Safety-head Angle Bar is *your own section* made break-proof

The remedy is in the use of Lackawanna Safety-head Angle Bars

which are made with slight depression at the center to keep the sharp under corners of the rail heads from touching the surface metal of the angle bar. This depression is only ⅛-inch deep at the lowest place and about one inch in length, or, in other words, extending only half an inch away from the rail end. The depression is made *while the bar is still hot.* No metal is removed, so that the skin surface is not weakened, nor is the section area of the bar reduced or otherwise weakened at this location.

The Lacawanna Safety-head Angle Bar will therefore do all that an ordinary angle bar will do and is decidedly safer against fracture, as proven in every instance where a careful test has been made.

In addition to the greater protection from accident, and from possible loss of life, property, and delay in service, the use of Lackawanna Safety-head Angle Bars makes very definite savings in reduced material and labor costs of the fewer renewals necessary, in reducing the labor of inspections, and in better preservation of the rails themselves.

Let us submit some interesting cost and performance data.



Other Lackawanna Aids to Better Track

The Lackawanna Deseaming Process

to which all our rails are subjected, leaves the rail head and base free from the cracks and weak, streaky, laminated, partially decarburized metal that under ordinary manufacturing processes is an inherent cause of undue surface wear and rail fracture.

The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.



Lackawanna Track Bolts and Spikes

Our track bolts and spikes of all standard sizes for light or heavy rails enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate



strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provide for internal stresses and impose the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in tpes especially suitable for ordinary steam railway service, for use in paved streets and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our booklets, "Lackawanna Deseamed Rails," "Lackawanna Improved Track Appliances," and "Lackawanna Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

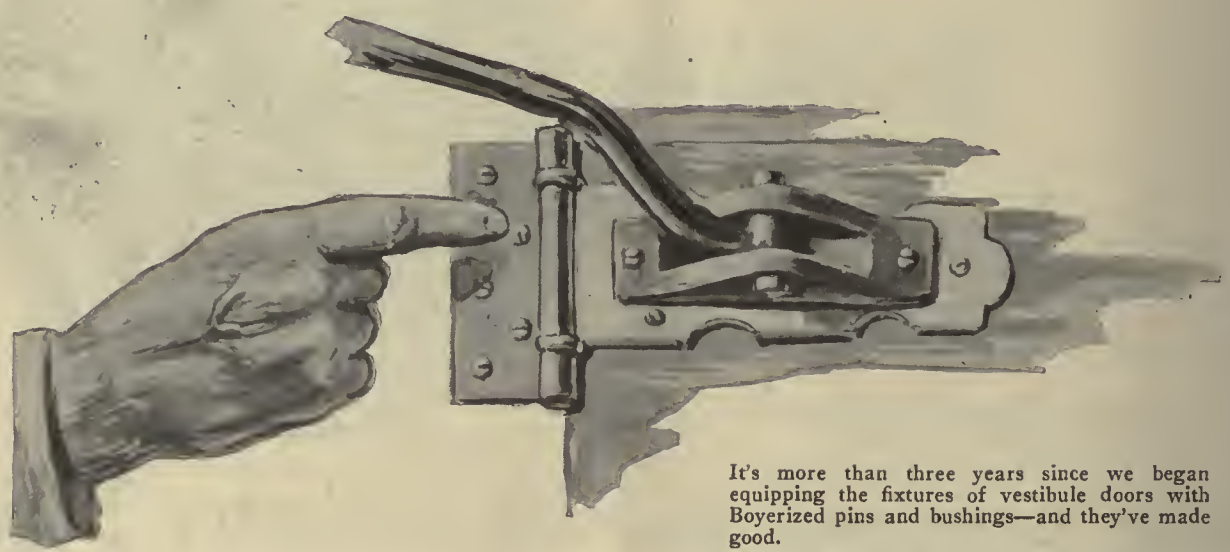
Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

500

Boyerize

Your Vestibule Doors to Get Easiest Operation



It's more than three years since we began equipping the fixtures of vestibule doors with Boyerized pins and bushings—and they've made good.

And why shouldn't they be just as successful there as they have been in making brake rigging safer and more economical to maintain?

When you stop to figure that the vestibule doors of the average city car are opened and closed 8 times a mile, 72 times an hour, 1440 times a 20-hour day, or 2880 movements in all, it makes a lot of difference to the platform men whether the doors work with or without waste motion.

Waste motion means extra work, bad temper and missed fares.

Boyerize your vestibule doors and you'll save far more than the difference between cold-rolled pins that last three months and the Boyerized kind that stay put for a long, long time indeed.

To Boyerize means to lengthen the life of your equipment and to lower the cost of your upkeep.

Boyerized Brake Hangers.

Boyerized Brake Lever Pins and Bushings.

Boyerized Wearing Plates between the Bolster and Bolster Carrier.



Boyerized Wearing Plates between the Pedestal Straps and the Journal Box.

Boyerized Pins and Bushings for door fixtures.

BEMIS CAR TRUCK COMPANY
Springfield, Mass.

Canvas Preserver
Priming Coat for NEW Canvas

SURPACO

Canvas Roof Paint
Top Coat for OLD and NEW Roofs

This Is the Stiffest Test for Any Canvas Preserver—TRY IT!



After preparing the canvas as directed below, hold it this way when beginning the test. Note how completely the surface is protected—yet the canvas is springy and totally free from stiffness.

Watch the paint on the fibres as you bend and twist the canvas. Absolutely no cracking or peeling! When you release the canvas, see how the fibres snap back to their original position.



Take an 8-inch square of new canvas and paint it with SURPACO Canvas Preserver—give it a free, heavy coat so that every fibre will be thoroughly saturated.

After the Preserver dries, cover with two coats of SURPACO Canvas Roof Paint, allowing sufficient time for thorough drying between coats. Take particular care, though, not to apply too much paint in these second and third coats—the idea is to work the paint thoroughly into the fibre and rub it out with the brush as thin as possible over the surface. This keeps the canvas pliable and elastic.

Now for the test. When the paint has dried thoroughly, grasp the canvas firmly at the sides with both hands (see illustration above). Then STRETCH IT, TWIST IT, BEND IT, JERK IT in any way you wish. See how the fibres always spring back to their first position. Note the pliability of the entire piece of canvas, how it stands up under distortion and strain and always comes back to its original shape. Note that the paint surface is always unbroken.

After you have made this test yourself you will know why SURPACO Canvas Preserver and Roof Paint actually preserve the fibre without stiffening the canvas; why they so successfully withstand the constant twisting, heavy vibration and exposure to which every car roof is subjected.

And, you will also know why it is best always to specify SURPACO for all of your canvas roofs.

Send today for generous samples—make this rigid test—satisfy yourself—then Buy it by the Barrel.



St. Louis Surfacer & Paint Co.
Hazel and Union Aves.
St. Louis, U. S. A.
Paints for Large Corporation Users Only



Just One Example of What Goes Into Collier Service

It would take a large volume to describe the organization that has made Collier Service synonymous with the best in car-card advertising.

But perhaps a reference to but one sub-department of the Collier Service organization may help to give a conception of the whole.

This is our perpetual inventory of Collier Service cars whereby we maintain records of scores of thousands of cars, not merely by number, but by location and the names of the advertisers' cards occupying the spaces, the kind of card on display, when each card was installed, when it is to be removed, and so on.

The cost of maintaining this particular means of seeing that every Collier Service advertiser is treated according to contract and that your car-card space is used to bring the utmost in results to all parties in interest runs over $200,000 per year.



Candler Building, New York

See This Useful Series For 10 Days FREE

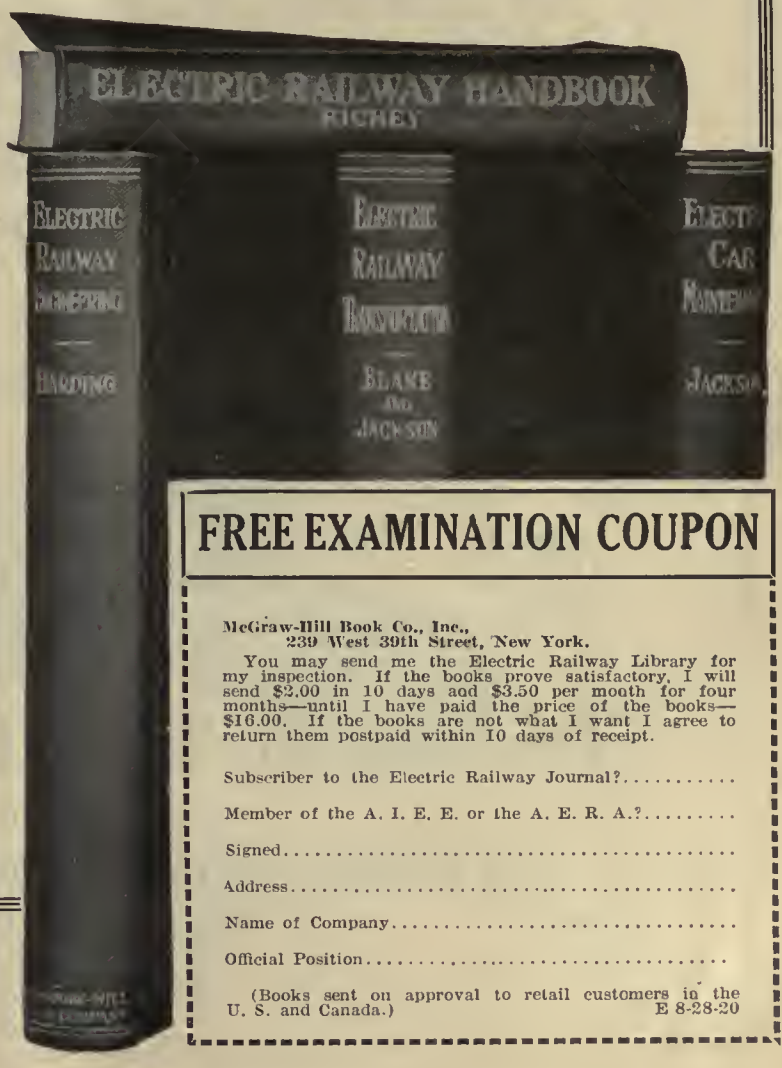
You are reading this advertisement because you can use up-to-date electric railway data. We do not know if you are concerned with construction, operation or maintenance problems. We do know that the Electric Railway Library is unrivalled as a source of clear-cut facts on the subject. To convince you of the usefulness of this set of books we will send them for 10 days' FREE examination. If you decide to keep them, and we are sure you will, payment may be made on liberal subscription terms.

ELECTRIC RAILWAY LIBRARY

4 volumes, over 2,000 pages, fully illustrated
$16.00 postpaid, payable in five installments

The four books give modern, reliable information derived from the actual experience of practical electric railway engineering men. The library contains no far-fetched suggestions—practical usefulness is its keynote. It points out ways and means of increasing efficiency and lowering costs which other engineers have found successful. You can apply these methods to your every-day problems. Why not make this information count for you? It will shorten the road to bet er results.

ELECTRIC RAILWAY ENGINEERING is a thorough manual of the broader engineering problems. ELECTRICAL RAILWAY TRANSPORTATION covers the business side of the subject—the relation of traffic to profits. ELECTRIC CAR MAINTENANCE has saved money for hundreds of lines. It is a complete treatment of this special subject. The ELECTRIC RAILWAY HANDBOOK is a pocket encyclopedia of electric railway construction, operation and maintenance. It is the Webster of the industry.



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SMALL MONTHLY PAYMENTS

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We are so convinced of the value of this library that we invite you to use the books for ten days without charge. You simply agree to return the books, postpaid, within 10 days of their receipt or to remit $2.00 and $3.50 each month thereafter for 4 months until the total price of $16.00 is paid. Put the coupon in your outgoing mail today.

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London: 6 and 8 Bouverie St., E. C.

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McGraw-Hill Book Co., Inc.,
239 West 39th Street, New York.

You may send me the Electric Railway Library for my inspection. If the books prove satisfactory, I will send $2.00 in 10 days and $3.50 per month for four months—until I have paid the price of the books—$16.00. If the books are not what I want I agree to return them postpaid within 10 days of receipt.

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Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Geared Blanks

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"The 'Standard' Brand on your material is an assurance of eventual economy."



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Specialized Babbitt for ELECTRIC RAILWAYS

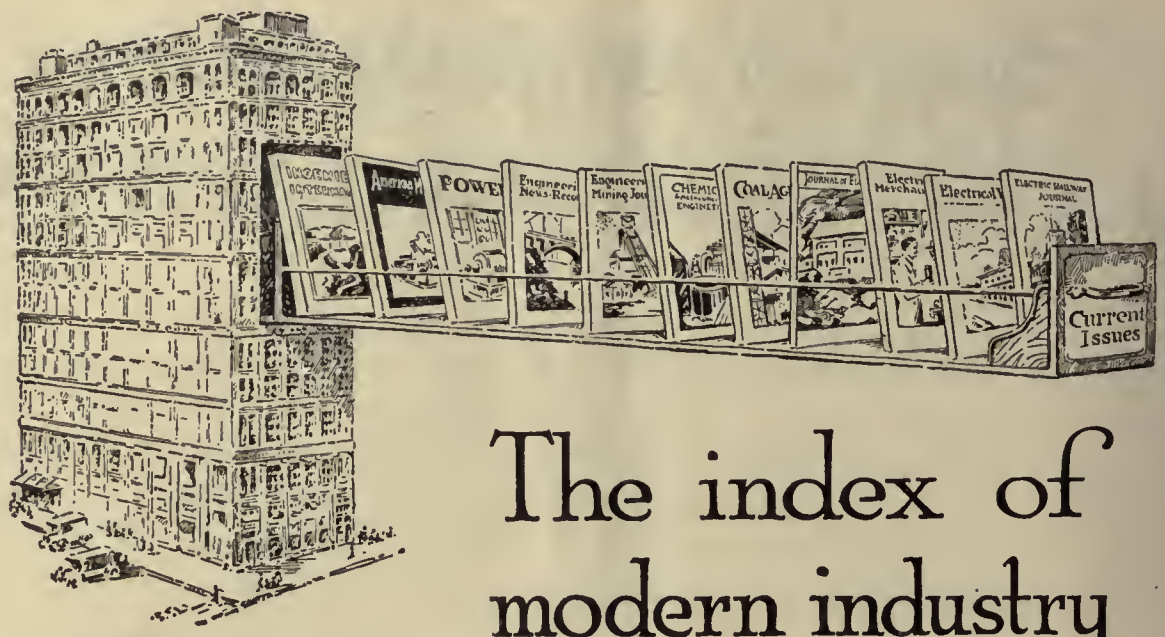
"ARMATURE" Babbitt Metal was developed to meet the demand in the electric railway field for a specialized product. How exceptionally well it has met this, users can best describe. It has demonstrated how impotent to meet conditions of strain, temperature, vibration and pounding are ordinary "all around" babbitts.

More-Jones chemists were aided by more than forty years of experience in metallurgical research and exhaustive tests. Armature Babbitt is compounded of only pure new materials—no scrap is used. It is strong, tough, flexible, of lowest specific gravity and one third lighter than lead-base babbitts. It is therefore of maximum wear-resisting anti-frictional qualities—positively the most economical babbitt procurable today for its particular employment in the electrical field.

Send for further particulars.



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ST. LOUIS, MISSOURI



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"IT always makes me think of a massive card index," said an engineer last week, referring to the big white McGraw-Hill building in New York.

In that building is a living, eleven-fold index to modern industry—eleven staffs of editors working in close contact are turning out eleven engineering publications, every one of which keeps its readers posted to the moment on the vital facts of its industry.

In electrical, mechanical, chemical, civil, and mining engineering fields, this publication team makes it its business to know what is happening today and to understand the essential problems of the men it serves. It leads in the solution of these problems, and it maintains a contact far enough away from the editorial desk so that the publications may carry the forecast shadows of coming events.

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Tenth Avenue at 36th Street
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H-8



Pacific Gas & Electric Co., San Francisco, Cal.

Ebony Asbestos Wood made to a formula

THIS switchboard will stand up under hard service because the insulating base, made according to a fixed formula, is free from metallic veins or other inherent defects and is uniform in physical and dielectric strength.

That's why densely impregnated Ebony Asbestos Wood is so widely used for switchboards, controller faces, barriers, etc.

We also make Transite Asbestos Wood, unimpregnated, a fireproof, non-conducting structural material of great strength and durability.

Both Ebony and Transite Asbestos Wood can be obtained in practically all thicknesses, are easily worked and will not burn, warp, shrink or crack.

Any of our branches will gladly furnish you with complete information. Send for the booklet.

JOHNS-MANVILLE CO.
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Asbestos
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ELECTRICAL MATERIALS

500 Miles of Good Investment

500 miles of the surface lines of Chicago are placed on a slag base of some kind—150 miles have been placed on slag concrete within the last ten years. Steel cross ties have been used extensively resulting in the most permanent and repair-free track that can be made. Hundreds of openings made in streets of all ages show no sign of corrosion on steel ties or rails in contact.

When Blast Furnace Slag is used as an aggregate in concrete the cement enters the pores of the slag—does not merely adhere to the surface as is the case with gravel—resulting in a solid homogeneous mass of which the slag is an integral part—it cannot be freed.

For full information on modern track, write to this company. Our engineers will be glad to assist you in your track problems.

Carnegie Steel Company
General Offices: Carnegie Building, Pittsburgh, Pa.

1381

A Splendid Record

Pleased passengers, pleased platform men and pleased investors is the result invariably obtained from the purchase of light-weight one-man safeties from the Quality shops.

The reason is plain--Quality--and years of experience that has enabled the Brains and Brawn of the Quality shops to construct for you the best that can be offered in a safety car.

St. Louis Car Company

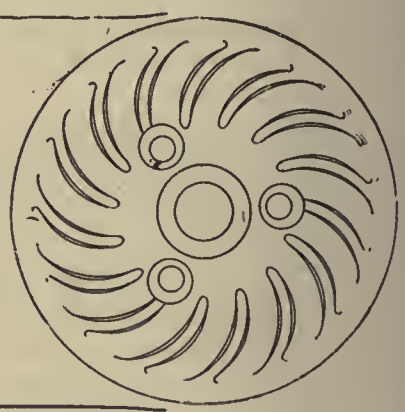
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The Birthplace of the Safety Car



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GRIFFIN F. C. S WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitting wheels to axles.

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ELECTRICAL CONDUCTORS
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THERMIT INSERT

The Joint Which Makes



The Rail Continuous

RAIL WELDING

The only method which prevents rail in paved track from cupping after years of service.

Send for Pamphlet 1232

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Colorado

464 Elec Ry cars in the state of which 409 are operated by companies who regularly use "Tool Steel" gears + pinions

$\frac{409}{464} = 88\%$

Watch for your state!

American Rail Bonds

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UNITED STATES
TWIN TERMINAL
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TRIPLEX

Send for new Rail Bond book

American Steel & Wire Company
CHICAGO
NEW YORK

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For Electric and Steam Railroads, in all types of construction
Converter and Electric Steel Castings
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ORIGINATORS OF MANGANESE STEEL TRACK WORK

Dependable Track Work for Electric Railways

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Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

ST. LOUIS FROG & SWITCH CO.
ST. LOUIS, MO.

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205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

RAMAPO

Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

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Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

Peirce Forged Steel Pins with Drawn Sheet Steel Thimbles

Your best insurance against insulator breakage

Hubbard & Company
PITTSBURGH, PA.

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For Storing and Reclaiming, Loading and Unloading Cars, Trucks and Wagons. Does the work of from 6 to 12 men and keeps equipment moving. Write for Literature

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PAPER INSULATED UNDERGROUND CABLE
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(Round, Grooved or Figure 8)
BARE COPPER WIRES AND CABLES
MAGNET WIRE
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Americanite Rubber Covered Wire
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AMERICAN ELECTRICAL WORKS
Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 812 Howard; Seattle, 100 1st Ave. So.

Bates Steel Pole Treatise



1921 Edition
(FREE)

A new catalogue and engineering handbook of inestimable value to engineers and pole users of the world, containing information necessary for the economical construction of modern transmission, transmission lines, electric railways, street lighting systems, and outdoor substations.

The most complete and accurate steel pole handbook ever issued—an authority upon modern steel pole line construction.

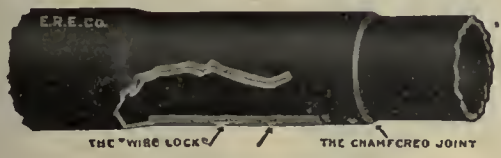
Partial List of Contents

1. Compact accurate engineering tables of—
   a. Sags for all temperatures and spans of wires and cables.
   b. Conductor sizes required to transmit electric power.
   c. Transverse loads on wires for various wind velocities.
   d. Clearances necessary to determine the minimum length of pole.
   e. Physical properties of wires and cables.
   f. Formulae and example pole line problems.
2. Discussion of the engineering principles governing the design, selection and installation of all types of poles.
3. A complete analysis of the elements governing the selection of factors of safety, and a discussion of world wide practise.
4. Comparison of Bates one piece steel poles with wood, fabricated steel, and tubular steel poles.
5. Method of manufacture of Bates expanded one piece steel poles.
6. Superior features and properties of expanded one piece steel poles.
7. Catalogue of poles, cross arms and fittings.

This treatise will be sent to anyone interested—Write today for your copy.

Bates Expanded Steel Truss Co.
208 South La Salle Street
Chicago, Illinois

ELRECO TUBULAR POLES



COMBINE
Lowest Cost — Lightest Weight
Least Maintenance — Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street



ANACONDA
Copper Wire
111 W. Washington St., Chicago

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG.

ARCHBOLD-BRADY CO.
Engineers & Contractors SYRACUSE, N. Y.

EUREKA PRODUCTS

Cummutators, Trolley Wheels, Sleet Trolley Wheels, Trolley Ears, Line Material, Controller Fingers, Brush Holders, etc.

We make quality goods.

THE EUREKA COMPANY, North East, Pa.

AETNA INSULATION LINE MATERIAL

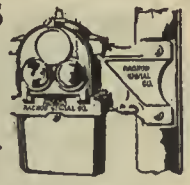
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

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INSULATED WIRES AND CABLES
WELDING WIRE WIRE STRAND
JOHN A. ROEBLING'S SONS CO., TRENTON, NEW JERSEY

AUTOMATIC SIGNALS
for Electric Railways
Highway Crossing Bells
Headway Recorders



NACHOD SIGNAL COMPANY, Inc.
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ARISTOS COPPERWELD

A Copper Conductor with the Strength of Steel.

Trolley Wire

Copperweld Wire is 60% stronger than solid copper wire, is 7% to 10% lighter, costs less per pound, lasts 3 to 4 times longer, and therefore is ideal for electric railway service. Write for catalogue No. 22.

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OFFICE AND WORKS, RANKIN, PA. NEW YORK CITY OFFICE 30 CHURCH ST.
WESTERN SALES REPRESENTATIVES STEEL SALES CORPORATION, CHICAGO, ILL.

U.S. ELECTRIC SIGNAL CO. WEST NEWTON, MASS.

U. S. Electric Contact Signals
for
Single-track block-signal protection
Double-track spacing and clearance signals
Protection at intersections with wyes
Proceed signals in street reconstruction work

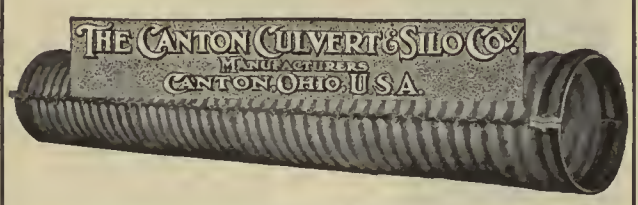
United States Electric Signal Co.
West Newton, Mass.

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With the general shortage in sheet metal stock, labor shortage and inability to get cars as fast as required, we are unable to fill orders for "ACME" (Nestable) and "IMPERIAL" Riveted Culverts as expeditiously as we would like, — and we are therefore making shipment promises accordingly.

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SPECIALISTS
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Standard—Insulated—and Compromise Rail Joints.

The Rail Joint Company
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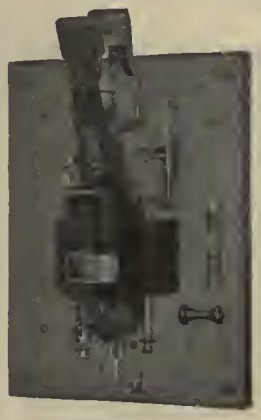
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THE CUTTER CO., PHILADELPHIA

AUTOMATIC RECLOSING CIRCUIT BREAKER

"The Circuit Breaker With Brains"



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But Also
WHEN TO RECLOSE

And Does It
AUTOMATICALLY

For the Sake of Decreased Operating Costs and Complete Protection to Your Equipment and Service

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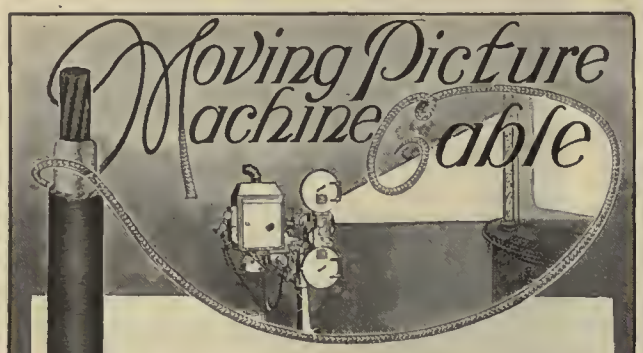
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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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The Buckeye Jack Mfg. Co.
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International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

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BRUTE Strength scientifically applied without bulk or clumsiness, that's Williams' "Vulcan" Drop-Forged "C" Clamps.

All Williams' Clamps are built with a purpose for every clamping purpose—maximum capacity 18 in.

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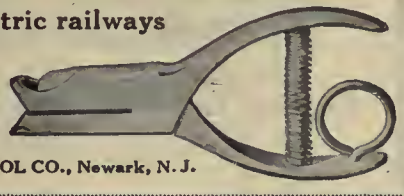
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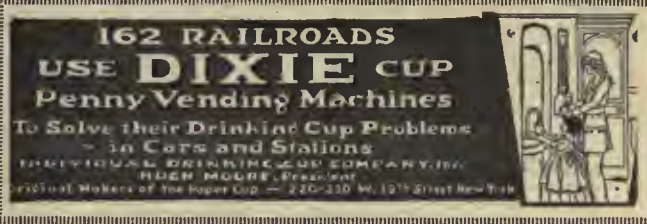
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We can help you
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Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

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"Think SEARCHLIGHT *First"*

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Eliminate Accidents

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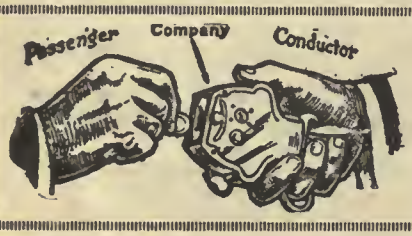
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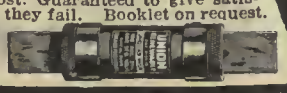
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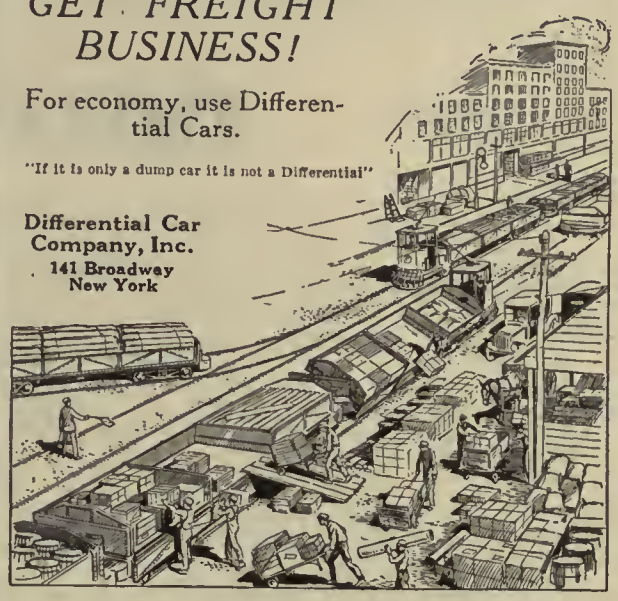
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For economy, use Differential Cars.

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The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



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Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents

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Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws.
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POSITIONS VACANT

ARMATURE winder wanted. Experienced on Westinghouse 68 & 101 B. railway motors, also Westinghouse compressor armatures. Also to do controller work. Location New York state. State wages desired and experience in first letter. P-727 Elec. Ry. Journal.

ASSISTANT to Master Mechanic on large interurban and city property located in Southwest. Applicant must know the business and be able to do office work, drawings, etc. P-722, Elec. Ry. Journal, Old Colony Bldg., Chicago.

COMPETENT master mechanic wanted for City property in Middle West. P-702, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

ELECTRICAL engineer wanted, with some experience in street railway work, in city in Middle West; state experience, references, and salary desired when replying. P-605, Elec. Ry. Journal, Old Colony Bldg., Chicago.

FIRST class street car mechanic wanted one experienced with mechanical and electrical equipment of street cars. Address Corpus Christi Railway & Light Company, Corpus Christi, Texas.

LARGE Interurban Railway is looking for man experienced in A. C. signaling on electric railways, who can take entire charge of signal department as Supervisor. Man with knowledge of telephones preferred; steady employment; good prospects. P. V. 725 Elec. Ry. Journal, Old Colony Bldg., Chicago.

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A CHANGE of position is desired by a young man experienced in street railway shop work; now engaged as assistant to superintendent of equipment. PW-715, Elec. Ry. Journ., Real Estate Trust Bldg., Philadelphia.

CAPABLE master mechanic of proven executive ability, seeks change. Present job and associates O. K. but desire broadre and associates O. K. but desire broader field. PW-729, Elec. Ry. Journal.

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be careful to put on envelope the key number in the ad and also local address of office to which reply is sent.

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Original letters of recommendations or other papers of value should not be enclosed to unknown correspondents — send copies.

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Stock for Sale

55 shares of stock in National Railway Appliance Co. of New York, at a bargain price. W. McK. White, 6712 Cornell Ave., Chicago, Ill.

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100-Tons

GIRDER RAIL

9 in. in depth, 141 lb. per yard. Prompt shipment.

R. D. TRIMBLE & CO.
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can be filled through many channels.

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can best be satisfied by others in your industry.

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in this paper reach the latter.

They cost little and invariably produce prompt returns.

For Every Business Want
"Think* SEARCHLIGHT *First"

0169

New—Used—Rebuilt
MACHINERY AND SUPPLIES
for construction and industrial work.

READING ENGINEERING CO., INC.
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Get your Wants

into the Searchlight

Summer Park Lighting
with Direct Current

We have for
Immediate Shipment

75-kw. Motor Generator Set.
D.C. Motor, 120-hp., 550/600-volt, 163 amp.
Direct connected to
A.C. Generator, 75-kw., 3-phase, 60-cycle, 6600-volt generator with 5-kw., 125-volt exciter, switchboard and instruments.
All Allis-Chalmers make.
Also 10-kva., 6600/110/220-volt transformer.
50,000 lb. 2/0 and 3/0 copper trolley wire.
Interurban Cars—Rails—Generators, etc., etc.

Write—Wire—Phone

ZELNICKER IN ST. LOUIS

NEW
80 lb. RAIL & ACCESSORIES

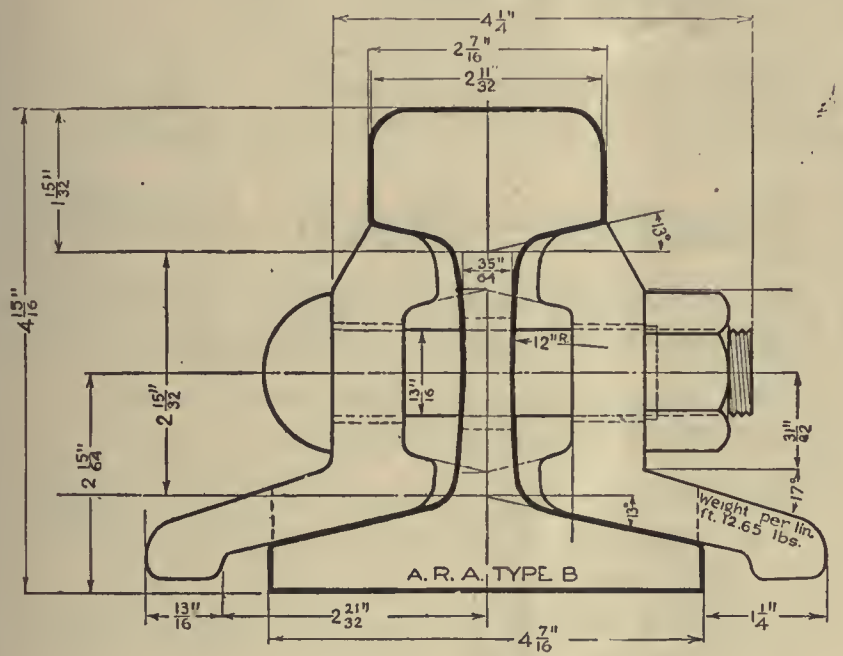
ANGLE BARS, SPIKES, BOLTS AND NUTS COMPLETE

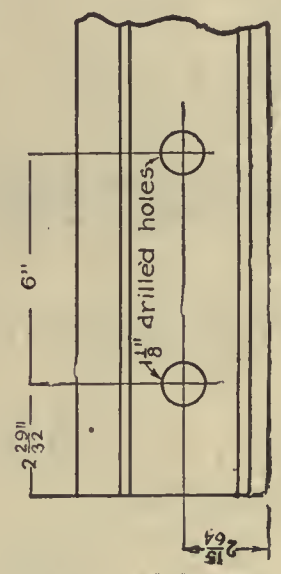
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A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, N. J.





Note actual dimensions of rail stated hereon.

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Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

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ARCHER & BALDWIN, INC.
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Telephone 4337-4338 Rector

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the equipment or machinery that you are not now using.

This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it *Before* depreciation *Scraps* it.

0178

FOR SALE

6—50-FT.

Interurban Cars

Complete

Mounted on Standard C-60-P Trucks; 4 West. No. 56 Motors.

Electric Equipment Co.
Philadelphia, Pa.

IMMEDIATE DELIVERY

Twenty-Five Cycle Rotary Converters

2—300-kw. 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380-volts.
1—250-kw., 3-phase, 25-cycle, 600-volt, General Electric rotary converters, complete with transformers, primary voltage 13,200, secondary 380 volts.

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20—G. E. 800's, complete with controllers.
All in Splendid Condition

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New 90-lb. rails, angle bars, bolts, nuts and spikes.

They will be gone soon. Write or wire for our quotations.

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A number of steel bridges on line of Cincinnati & Columbus Traction Co. For quick acceptance at $1.00 per 100 lb. as is. Photographs on request.

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2—McKean Gaso-Electric Cars.
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GLOUCESTER, MASS.:
2—203 hp. B. & W. Water tube boilers
1—266 hp. B. & W. Water tube boiler
1—600 hp. B. & W. Water tube boiler
1—300 hp. 22 in. x 48 in. Harris-Corliss Single Engine
1—500 hp. 28 in. x 36 in. Hamilton-Corliss Single Engine
1—1500 hp. 30 in. x 48 in. x 48 in. Penn-Corliss Cross Compound Engine
1—250 kw. W. H. Belted Multipolar D.C. Generator
1—400 kw. G. E. Eng. Type Multipolar D.C. Generator
1—850 kw. G. E. Eng. Type Multipolar D.C. Generator
Switchboard and Misc. Auxiliary equipment

NEWBURY, MASS.:
3—115 hp. Kendall Horizontal Return Tubular Boilers
2—14 in. x 28 in. x 36 in. Slater-Corliss Cross Compound Engines
2—250 kw. W. H. Eng. type Multipolar D.C. Generators
Switchboard and Misc. Auxiliary equipment

ESSEX, MASS.:
2—150 hp. Kendall Horizontal Return Tubular boilers
1—150 hp. new eng. horizontal return tubular boiler
2—13 in. x 23 in. x 22 in. McIntosh & Seymour Tan. Com. High Speed Engines
2—220 kw. Walker Eng. Type Multipolar D.C. Generators
1—55 kw. G. E. Direct connected 200 volt Booster Set.
1—150 hp. New Eng. Boiler
Switchboard and Misc. Auxiliary equipment

LAKEVILLE, MASS.:
3—250 hp. A. & T. Water Tube Boilers
1—16 in. x 30 in. x 42 in. Hamilton-Corliss Cross Compound Engine
1—325 kw. W. H. Eng. Type Multipolar D.C. Generator
Switchboard and Misc. Auxiliary equipment

SALEM, MASS.:
1—2500 A.B.H. G. E. Curtis Horizontal 60 Cycle, 445 volts A.C. Turbo. Generator and Direct connected Exciter
1—Alberger Spiroflo jet condenser and Auxiliaries.

HYDE PARK, MASS.:
3—500 hp. B. & W. Water Tube Boilers
1—1500 hp. 30½ in. x 52 in. x 48 in. Penn Cross Compound Engine
1—750 hp. 20 in. x 40 in. x 48 in. Greene Cross Compound Engine
1—700 hp. 20 in. x 40 in. x 42 in. Penn. Cross Compound Engine
1—850 kw. G. E. Direct Connected D.C. Generator
1—525 kw. G. E. Direct Connected D.C. Generator
1—500 kw. G. E. Direct Connected D.C. Generator
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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Babbitt Metal
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
Johns-Manville Co., H. W.

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Roller and Ball
Gurney Ball Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Bricks, Fire
Green Engineering Co.

Brooms, Track, Steel or Rattan
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car (See Headlining)

Checking
Industrial Protective Co.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Condensers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Conduits, Underground
Johns-Manville Co., H. W.

Connectors, Solderless
Frankel Connector Co.
Westinghouse Elec. & Mfg Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Johns-Manville Co., H. W.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal and Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.
Green Eng. Co.
Portable Machinery Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
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Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.

Creosote
Barrett Co., The

Creosoting
Barrett Co., The

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg Co.

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Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices (See also Track Work)
Cleveland Frog & Crossing Co.
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

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Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
American Steel & Wire Co.
Roebling's Sons Co., J. A.

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Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Byllesby Co., Inc., H. M.
Clark Management Corp., E. W.
Engel & Hevenor
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jacobs & Co., J. L.
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Parsons, Klapp, Brinkerhoff & Douglas
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Direct Current Ammeter

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National Railway Appliance Co.

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Brill Co., The J. G.
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Consolidated Car Fender Co.
Electric Service Supplies Co.

Fibre and Fibre Tubing
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Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Field Coils (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus
Castle, Inc., James M.
Johns-Manville Co., H. W.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.

Flooring, Grating
Irving Iron Works

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Inc., Wm.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
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Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
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Standard Steel Works Co.

Gear Cases
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Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Grates, Chain
Green Eng. Co.

Greases (See Lubricants)

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Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

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Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
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Ford-Chain Block Co.
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Ingersoll-Rand Co.

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Ohio Brass Co.

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Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

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Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Insulators (See also Line Material)
Anderson Mfg. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Jacks (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Templeton, Kenly Co., Ltd.

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Rail Joint Co.
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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
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Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr., & Co., Wm.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
Galena-Signal Oil Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Magnet Wire
Belden Mfg. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molded Insulators and Parts
Belden Mfg. Co.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
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Ohmmeters
Weston Elect'l Instrument Co.

Oils (See Lubricants)

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Westinghouse Elec. & Mfg. Co.

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Mitchell-Rand Mfg. Co.

Paints and Varnishes (Preservative)
St. Louis Surfacer & Paint Co.

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National Ry. Appliance Co.

Paving Material
American Brake Shoe & Fdry. Co.
Barrett Co., The

Paving, Pitch
Barrett Co., The

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Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
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General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Schutte & Koerting Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
Carnegie Steel Co.
Foster Co., L. B.
Lackawanna Steel Co.

Rail Grinders (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Rail Welding (See Brazing and Welding Processes)
Rail Welding and Bonding Co.

Rails, Relaying
Foster Co., L. B.
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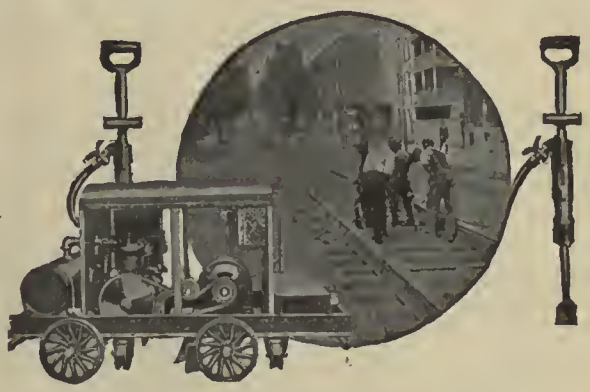
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Safety Bulletin No. 105

THE TRAVELERS INSURANCE CO.

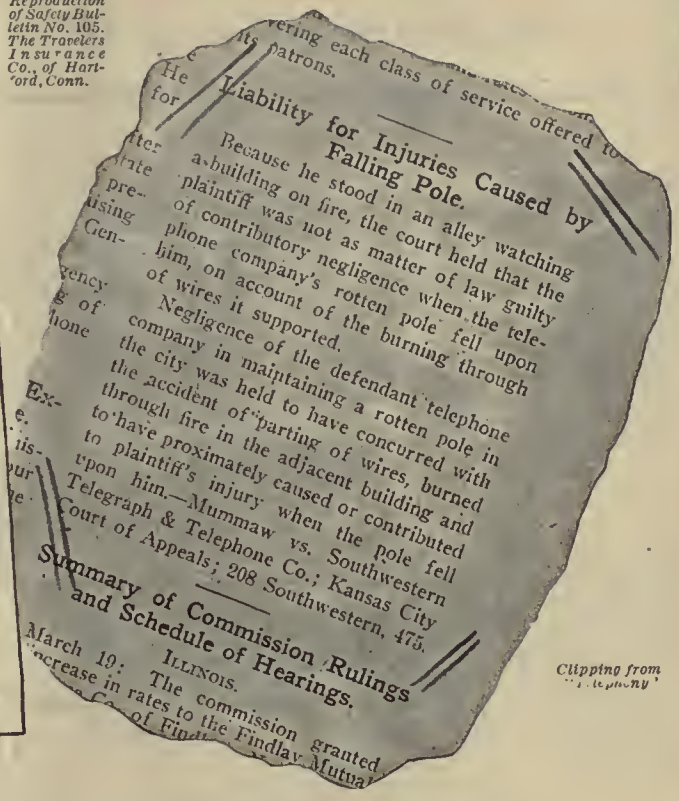
HARTFORD, CONN.



NEGLECT

A 40-foot pole which rotted away until in a dangerous condition. Don't fail to report bad conditions. Call them to the attention of the superintendent.

Reproduction of Safety Bulletin No. 105. The Travelers Insurance Co., of Hartford, Conn.



...vering each class of service offered to ... its patrons.

Liability for Injuries Caused by Falling Pole.

Because he stood in an alley watching a building on fire, the court held that the plaintiff was not as matter of law guilty of contributory negligence when the telephone company's rotten pole fell upon him, on account of the burning through of wires it supported.

Negligence of the defendant telephone company in maintaining a rotten pole in the city was held to have concurred with the accident of parting of wires, burned through fire in the adjacent building and to have proximately caused or contributed to plaintiff's injury when the pole fell upon him.—Mummaw vs. Southwestern Telegraph & Telephone Co.; Kansas City Court of Appeals; 208 Southwestern, 475.

Summary of Commission Rulings and Schedule of Hearings.

ILLINOIS.

March 19: The commission granted ... increase in rates to the Findlay Mutual ...

Clipping from "Telephony"

Neglect and Its Consequences—

THE warning and suggestion published in Safety Bulletin No. 105 of The Travelers Insurance Company to prevent accident losses seems very necessary when we read the accompanying article from *Telephony*.

The Kansas City Court of Appeals ruled in the case of Mummaw vs. Southwestern Telegraph & Telephone Company that "Negligence of the defendant telephone company in maintaining a rotten pole in the city was held to have proximately caused or contributed to plaintiff's injury when the pole fell upon him."

Decayed poles, in addition to being an economic waste, become a human hazard, endangering life and limb of the public as well as linemen.

Creosoting poles protects them against early failure—materially increases their life—and eliminates the loss due to neglect in permitting the poles to decay.

The safest course is to creosote poles with Carbosota Creosote Oil, either by the Open Tank Process, or surface treatments, as conditions may require. Carbosota is positively the most efficient wood preservative. It is absolutely uniform, combining maximum toxicity with perfect physical fitness and permanency. It is obtainable everywhere in the United States in any quantity.

Barrett

TRADE B MARK

Carbosota

Grade-One Liquid

Creosote Oil

Carbosota Creosote Oil is standardized for non-pressure treatments.

Recommendations for treatment of poles obtainable gratis by addressing nearest office.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. In regions of moist, warm climate wood of some species may start to decay before it is completely air-dry. Exception should be made in such cases, and treatment modified accordingly.)

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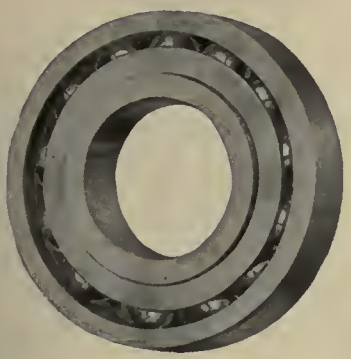
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L. O. Smith, V. P. & Gen. Mgr.

Chas. Buehler, Secy.

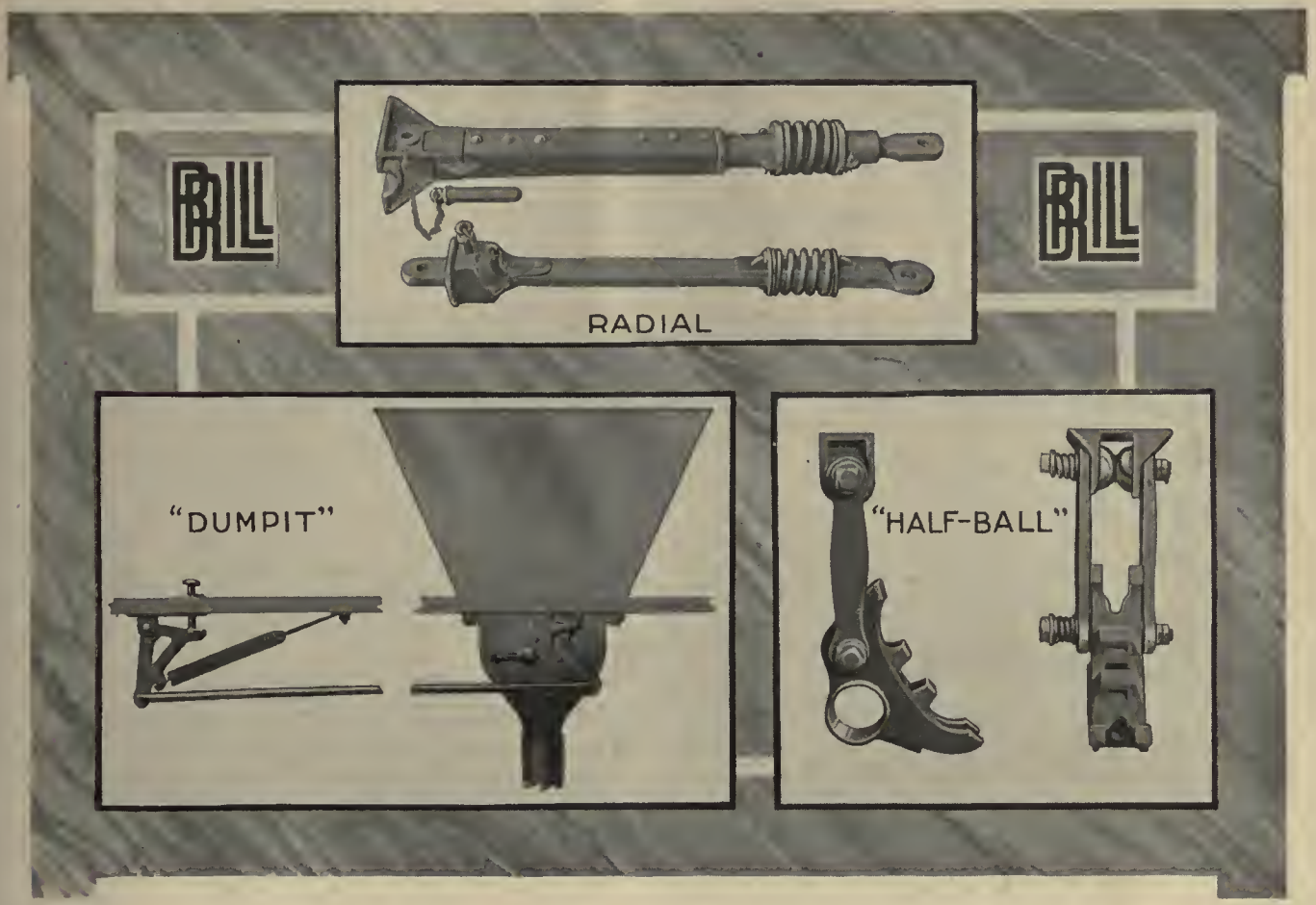
TOOLS

Armature and axle straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil tapping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands



CAR EQUIPMENT

Armature and axle bearings
Armature and field coils
Bearings (axle and armature)
Brush-holders and brush-holder springs
Brake, Door and other handles
Brake forgings, rigging, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resisters
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



Brill Specialties

The "Radial" Drawbar, "Dumpit" Sand Box and "Half-Ball" Brake Hanger are three well-known Brill Specialties, which command attention by their most satisfactory and economical service. Years of practical operation have firmly established them as important parts of electric railway equipment.

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